SOUTHERN RHODESIA.

IMPERIAL BUREAU OF MYCOLOGY
4 AUG. 1927

REPORT

OF THE

Secretary, Department of Agriculture,

For the Year 1926.

Presented to the Legislative Assembly,
1927.

Salisbury, Rhodesia:
Printed by the Government Printer.

[C.S.R. 5—1927.] 1927.

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I have the honour to submit my report for the year ended 31st December, 1926.

GENERAL.

On account of the increasing volume and varied nature of the activities of the Department it would be difficult to deal fully in my report with all matters affecting the different branches, and more extensive particulars will be found in the reports of the heads of the various branches of the Department, which are appended hereto. These reports will show very clearly the nature and volume of the work carried out by the technical officers of the Department. Many calls have been made on these officers during the year, and it is most gratifying to find their services and advice are so much in demand. It is hoped that both established farmers and new settlers will continue to make full use of the agricultural staff. Every effort is made to arrange for the visits of technical officers being distributed as evenly as possible throughout the country, and, although it may not always be possible to arrange for officials to visit districts or farms when desired, endeavours are made to meet all demands for visits or advice.

Farmers' associations should communicate with the Department and submit dates on which it is desired that officials should attend their meetings or visit their districts. At these meetings lectures on various subjects affecting agricultural matters generally can be given. Lectures of this nature should be of much assistance, not only to new settlers, but also to farmers with a limited knowledge of agriculture. It is very desirable, however, that farmers' associations should co-operate with the Department in connection with the arrangement of tours and visits of the technical staff, and applications for the services of these officers should be forwarded to the Department as early as possible in the year so that suitable itineraries can be drawn up.

CROPS, 1925-1926.

The conditions for the growing of crops in the early part of the season promised good results, but heavy and fairly continuous rains in February and March, with little sunshine, caused a certain amount of damage, not only to tobacco and cotton, but also to the maize crop. In spite of this, however, the maize crop yielded approximately 1,400,000 bags, which is the second highest total on record. The crop for the 1922-1923 season is so far the highest on record for this Colony and totalled over one and a half million bags. With the increased acreage brought under cultivation during the year under review, there is every prospect of the maize crop for 1926-1927 exceeding all previous returns. In the mealie-growing districts in Mashonaland the outlook so far is most promising, but much will depend on getting rains when they are most needed. Unfortunately, the rainfall in portions of Matabeleland has been most disappointing, and the crops there are likely to be seriously affected.

The tobacco crop reaped amounted to over 5,000,000 lbs. of Virginia and 346,000 lbs. of Turkish leaf. As in maize, the acreage planted to tobacco during the year shows a big increase, and, given a normal season, should more than double last year's total. Many growers will probably find that the least difficult part of a tobacco crop is the growing. Good crops can very easily be ruined in the curing stage, and the question of grading is a matter for which farmers must make satisfactory provision. The existing facilities for grading of tobacco leaf are likely to be quite inadequate for coming requirements, and this is a matter which growers should see to themselves without delay. Many tobacco growers show little inclination to undertake the grading of their leaf, and prefer to rely on existing establishments for doing this work. With the increasing production of the tobacco crop,

however, it is very evident that growers must either do their own grading or co-operate and provide for district grading arrangements at convenient centres. If farmers can possibly grade their crops on their own farms this would seem to be the most satisfactory method, but, failing this, it might be possible to form district co-operative grading establishments.

The cotton crop, although in excess of the previous year's total, was disappointing, but to a certain extent this is accounted for by unsuitable weather and the poor class of seed used in a good many cases. The latter cause will to a great extent be remedied in time, and much useful work is at present being carried out at the cotton seed breeding station at Gatooma with a view to finding the varieties of cotton most suitable to the climatic conditions of this Colony. There is no reason to anticipate that cotton should not eventually be profitably grown in Southern Rhodesia, but before this stage is reached a good deal of experimental work will have to be done.

In both tobacco and cotton the inclination in many cases has been for growers to pin their faith to one crop, and the danger of doing so will probably only be realised by experience. It is most desirable that caution should be exercised in growing crops such as tobacco and cotton. A reasonable acreage well attended to is a much safer method to adopt and is likely to give more satisfactory results. In order to minimise the risk of total failure through the loss of any particular crop, mixed farming is most necessary, and this is probably being more and more recognised. The result of this is that cows, pigs and poultry are being given more attention, and in many cases are carrying farmers over lean years.

The monkey nut crop is likely to increase, but, like other crops which might be classed more or less as side lines, ground nuts in many cases have not received sufficient attention. There is no reason, however, why this crop should not be profitably grown, but more care will have to be taken to give the crop a fair chance of making good.

It is surprising that so little attention is given by people keeping cattle to the growing of sweet potatoes. This is a most valuable crop and one which can carry the dairy cow over many months in the year. The green tops are usually available from December until April or May, and the roots, which are greedily eaten by cattle, can then be used as feed.

Certain districts are giving more attention to the growing of crops for green manure, and this is a method of manuring deserving much more attention than it has so far had.

In very few districts are potatoes grown for export, and about 60 per cent. of the whole crop is grown in Salisbury district.

The growing of sunflower, except for ensilage or stock feed, is not largely undertaken, and the total output from this crop has been on the decline for the last year or two.

Other crops call for no special comment.

The total area under cultivation for summer crops for the year 1925-1926 was approximately 355,500 acres, being an increase of over 20,000 acres on the total of the previous year. Unfortunately, owing to the failure of numbers of farmers to render their agricultural returns, figures given are only approximately correct, but the margin of error is probably very small.

The report and statistics of summer crops grown by Europeans for the season 1925-1926 provide interesting information, and will be found in Departmental Bulletin No. 626 and also in the February issue of the *Rhodesia Agricultural Journal*.

CATTLE.

There was little or no advance in the price of slaughter cattle during the greater portion of the year, but latterly prices have been hardening and there is every likelihood that they will improve further. The rising price is probably due to the number of cattle purchased for slaughter by the Imperial Cold Storage Company and to increasing demands from the Congo. Dairy cows still command good prices, and the demand for this class of animal is likely to increase.

The total exports of cattle for the year amounted to 74,646, being an increase of 13,098 on the total for the previous year.

During the last five years the totals of the cattle exported were as follows:—

1922	23,938
1923	34,841
1924	50,770
1925	60,545
1926	74,646

It will thus be seen that the yearly exports show a satisfactory and steady increase. The numbers of cattle slaughtered for local consumption must also have increased considerably.

For the purpose of comparison the cattle exports for the years 1925 and 1926 and the centres to which the animals were exported are shown below:—

	1925.	1926.
Union of South Africa ...	9,591	12,250
For slaughter for overseas (Imperial Cold Storage)	35,675	49,595
To England and overseas (on hoof)	236	310
Belgian Congo (for slaughter)	4,768	9,016
Belgian Congo (trek oxen)	383	...
Belgian Congo (for breeding)	9,269	2,829
Northern Rhodesia (for breeding)	85	32
Portuguese East Africa ...	538	614
Totals	60,545	74,646

From this it will be seen that, although the export of breeding cattle shows a decrease, the increase for slaughter purposes exceeds 20,000.

Attention might be drawn to the large number of cattle purchased by the Imperial Cold Storage for slaughter for the overseas market. This outlet for cattle has been of the greatest value to many farmers and cattle breeders. When the new cold storage works are opened in Bulawayo the export figures will no doubt drop, but the market will still be available, and, although prices may never reach the high-water mark obtained some years ago, there is no reason to anticipate that prices giving a fair margin of profit to the breeder should not be available.

STATISTICS OF LIVE STOCK AND ANIMAL PRODUCTS FOR THE YEAR 1925.

These particulars will be found in Departmental Bulletin No. 595, published in June, 1926, and obtainable from the Department on application, and they were also published in the *Rhodesia Agricultural Journal* for the month of June, 1926.

A comparative statement for the years 1914 to 1925 is attached under Annexure "A."

TECHNICAL BRANCHES OF THE DEPARTMENT.

The work and operations of the different branches of the Department need only be briefly referred to by me, as the attached reports of the officers in charge of these branches deal very fully with their particular activities.

As land settlement progresses the staff of the Agricultural Department must be correspondingly increased, and additional technical and other officers employed, or in some cases new branches formed.

During the year the Government were fortunate in securing the services of a first-class Cattle Adviser and also a highly qualified Mycologist. Since taking up their duties the services of both these officers have been much in demand.

Chief Agriculturist's Branch. — This branch deals with all matters relating to crops and to agriculture generally, and in the meantime the Tobacco Advisers come under the control of the Chief Agriculturist. In addition to ordinary extension work, the branch undertakes supervision and advisory duties in connection with the work being carried out on the Gwebi and Matopo Government Farms, the Agricultural Experiment and Tobacco Experiment Stations in Salisbury. Full particulars of the work of this branch will be found in the report of the Chief Agriculturist attached hereto under Annexure "B."

The experiment of training European apprentices at the Tobacco Experiment Station at Salisbury has proved most satisfactory. The youths accepted for training have done excellent work and show the greatest interest in their work. Training is given in all matters relating to tobacco, from the preparation of seed beds until the crop is finally disposed of. In addition, training and instruction is given in the growing of rotation crops, milking and handling of dairy stock, brick making and building, and generally all duties with which a practical farmer should be acquainted. Plots for tobacco growing are allocated to the apprentices, and these have to be stumped and prepared without the assistance of any native labour. It is most gratifying to see the spirit in which these boys tackle all work allocated to them and the unfailing keenness they display. Their work shows that the Rhodesian youth of today is just as capable of carrying out as hard work in this Colony as could be undertaken in any other part of the British Empire. Farmers and others visiting Salisbury should take an opportunity of visiting the Tobacco Experiment Station to see for themselves what young Rhodesians are capable of doing in the nature of good hard work. Regular hours and plenty of work are excellent tonics, and the healthy appearance of the apprentices on this station is an object lesson in this respect. The manager of the station deserves the greatest credit for the manner in which he handles his duties.

It will be noted in the report of the Chief Agriculturist that reference is made to the question of growing sugar cane in Wankie district. Mr. F. D. Thompson of Delano Estate, Gwelo, who has had much experience in connection with sugar growing, visited Wankie district at the request of the Minister of Agriculture, and reported very favourably on the prospects of successfully growing sugar cane in that district. It is hoped that during the coming year more progress will be made in this matter.

Ten additional Tobacco Advisers were added to the extension staff of this branch during the year. These officers were posted to various districts as local advisers to tobacco growers. It was felt by the Government that, with so many new growers of tobacco, much help could be given by providing a number of practical officers thoroughly qualified in all matters relating to the growing, curing and grading of tobacco. Nine of these advisers came from America, and were selected by Mr. O. E. Guy of the United Tobacco Company, and Mr. J. B. Lewis, county agent at Lawrenceville, Virginia, after personal interviews with a large number of applicants. These gentlemen are to be congratulated on the excellent selection made, and the Government is fortunate in having secured for this Colony the services of Tobacco Advisers with a sound practical knowledge of their work, and who may be said to have grown up with tobacco growing in Virginia.

Dairy Branch.—The report of the Dairy Expert, which deals with the dairying, butter, cheese and pig industries, shows that the class of dairy stock in the country is improving,

although the improvement is not so rapid as might be expected. On the other hand, it will be noted that the housing of dairy cattle in many places does not receive the attention it requires, and it is to be regretted that this important side of dairying is not making better progress. In the past many farmers were inclined to treat dairying purely as a side line, but it should be realised that the dairy cow during the last year or two has done much to keep the farmer on the land. The demand for good dairy cattle is in excess of the supply, and for this reason, as stated by the Dairy Expert, farmers who, on account of their distance from a railway, cannot take up dairying might very well cater for this demand.

The milk-recording scheme in the Colony is making little headway, but, when once it is realised that milk recording is practically a certain means of obtaining higher prices for dairy stock, more advance in this direction may be looked for. There is still an inclination in some quarters to under-feed and over-milk, and it should be realised that, unless animals are suitably fed, not necessarily on costly rations, the milk supply must diminish both in quantity and quality. The feeding of young stock generally might receive some more attention. When young animals are neglected, the result must naturally affect their future offspring.

The various creameries in the Colony have had a busy year, and their production of butter constitutes a record, reaching a total of 1,175,000 lbs. In the year 1922 the production for the year was 280,000 lbs., and from this it will be seen that big strides have been made during the last four years. The value of the butter exported during the year was £55,537, which is roughly 38 per cent. in excess of the value for the previous year's butter exports.

Good progress is being made in cheese making, but the establishment of a large central storage station is very essential to enable cheese to be graded and stored during the scarce season under conditions of controlled temperatures. Markets for Rhodesian cheese were found in the Union of South Africa, the Congo, Northern Rhodesia, Portuguese East Africa and Nyasaland, and there is every likelihood of this industry expanding considerably.

The pig industry is making satisfactory headway, and as the dairy industry expands the pig industry must correspondingly expand also. The price paid for pigs during the year has varied very little, and on the whole has been fairly satisfactory and sufficient to allow pig breeders a reasonable return. A good deal more attention is being paid to the feeding and housing of pigs, with the result that better animals are being reared.

Poultry Branch.—The itinerant work of this branch is always exceptionally heavy, as practically all farmers keep poultry—some on a large scale and others more as a side line. In addition, most people living on plots and many householders keep poultry to supply their own requirements. Naturally they all look to the Government Poultry Experts for advice, and the officers of this branch have, therefore, calls upon their services from many sources beyond the farming community. The result is that the Poultry Experts are almost continually on the move throughout the year, and can seldom rely on having a week-end free from their work. The improvement in the various classes of poultry in the Colony bears testimony to the good work done by the officers of the poultry branch. Much hard work has yet to be done, however, to get the poultry industry in a better position so far as the production of eggs is concerned. The laying test in Salisbury shows that eggs can be obtained throughout the year, but to do so poultry keepers will have to realise that the advice preached by the Poultry Experts must be followed, and during the rainy season special care must be taken of the birds. The methods adopted at the egg laying test are simple, and could readily be carried out by any keeper of poultry. In many cases these methods are being carefully followed out, with the result that poultry keeping gives a profitable return. Others adopt a free and easy system, and give their birds little care or attention, with the result that their poultry keeping does not pay. Like any other line of business, poultry keeping must be well done—not necessarily expensively done—if it is to show a profit. Poultry keepers, and particularly new settlers, should make every effort to start on sound lines, not only in the selection of suitable birds, but also in arranging proper housing for their birds, and seeing that they get suitable food. If they do so, there is no reason why their poultry keeping should not be a success financially.

Cotton Specialist's Branch.—Although the cotton crop was very disappointing, the yield per acre showed an increase on the preceding year. This is a step in the right direction, but the yield per acre must give a much higher average return before a payable figure is reached. In this direction the efforts of the staff at the Government Cotton Seed Breeding Station at Gatooma, under the supervision of the Cotton Specialist, are being directed. Early-maturing strains and varieties are being experimented with, and there is every reason to anticipate that varieties particularly suited to the Colony will be found. In the report of the Cotton Specialist it will be noted that, taking "Improved Bancroft," a variety of which much favourable comment has been heard in the past, as a standard of comparison, four other varieties have been found giving from 40 to 59 per cent. better results. Many other strains will be tested with a view to obtaining still better results.

Although a number of farmers have dropped cotton, and wisely so in some cases, a great many are continuing, but on a lesser scale. The system of rushing in big acreages in the hope of obtaining a heavy crop and selling at good prices is more or less a gamble.

The one-crop farmer is always likely to be hard hit unless he happens to strike an exceptionally favourable season. The cotton industry in Southern Rhodesia is still in its infancy, but when varieties suitable to the climatic conditions of the country have been found this crop should be able to hold its own with other crops grown. The report of the Cotton Specialist (Major G. S. Cameron), attached under Annexure "E," contains much interesting information in connection with the work done and experiments carried out during the year by the officials of the Empire Cotton Growing Corporation. The Colony is fortunate in having Major Cameron as its Cotton Specialist, and neither he nor his capable assistants spare themselves in their efforts to make cotton growing a successful and profitable industry in Southern Rhodesia.

Entomological Branch.—As more cultivation takes place and the area under various crops increases the work of this branch expands. The year under review has been an exceptionally strenuous one for the Entomologists, and much time and work have been given to the question of successfully combating tsetse fly. In addition to this, cotton and other pests affecting crops called for close attention.

The most serious pest to be contended with in the meantime is undoubtedly tsetse fly, and this pest is causing a good deal of anxiety. For many years efforts have been made in different parts of South and Central Africa to find a successful means of getting rid of fly, but so far no appreciable progress has been made. There seems little doubt that the only system likely to be successful in pushing the fly back is cultivation and occupation of the land thus reclaimed. Destruction of big game and fencing no doubt assist to a certain degree, but unless the line of occupation is gradually advanced into fly country, no permanent relief is likely to be gained from fencing and the shooting of big game. There is probably little likelihood of fly increasing to any appreciable extent in occupied country, but the danger of animals in the vicinity of existing fly areas contracting trypanosomiasis is always a source of anxiety to cattle owners. It is hoped that during the coming year more success may attend the efforts being made to find means of dealing satisfactorily with this serious pest. The cost of clearing large tracts of country of timber and bush would be prohibitive, and this would have to be done gradually. Unless land cleared, however, were immediately occupied and developed, little good would be obtained from such clearing.

The report of the Chief Entomologist deals fully with the question of combating tsetse fly and other pests dealt with by his branch.

During the year two Entomologists were added to the staff.

Each variety of crop seems to have its own particular pest to contend with, but no effort is spared by the Entomologists of the Department to find means for successfully combating these pests. Fortunately during the year there was no locust invasion, and it is hoped that the Colony has seen the last of these destructive visitors for many years.

Irrigation Branch.—There has been a marked increase of applications for the services of the officers of this branch. One of the principal causes for this is due to the desire of many farmers to get expert advice as to how to deal with soil erosion. The last two seasons, having been abnormally wet, have shown farmers the necessity for taking steps to prevent heavy losses of valuable soils through erosion. This important subject has not yet in many instances received much attention from land owners, but farmers would be well advised to take every precaution to protect their soils against wash, and in this connection the officers of the Irrigation Branch will always be willing to give advice. Other activities of this branch include advice on irrigation and water power schemes, the construction of tobacco barns and farm buildings, dipping tanks, wells and other similar matters.

The number of drills now available for water boring is six, but there is every likelihood that this number will have to be increased in the near future, as the requests for the services of these drills are so great that they cannot keep pace with the demands made. During the next year or two the applications for boreholes are likely to increase. Two drills are working continuously on native reserves, and the other four are sinking boreholes on alienated Crown land and private farms. There are many excellent farms available for alienation, with excellent soil for the growing of crops, but with no permanent water supply, and as these farms are taken up the demand for boreholes is steadily increasing. In other cases wells are being sunk, but the general desire seems to be for boreholes in preference to wells. Every effort will be made to overtake and complete the boreholes applied for, and it is hoped when this is done that it may be possible to provide, where necessary, a water supply on Crown land farms prior to their alienation. The value of a good water supply on any farm cannot be over-estimated.

Hydrographic Engineer's Branch.—The annual meteorological report for the year 1924-1925 was presented to the Legislative Assembly in May last, and it is hoped that the report for the year 1925-1926 will soon be available. The report of the Hydrographic Engineer furnishes particulars of the meteorological and hydrographic work of this branch. Continued investigations are being made with a view to ascertaining whether seasonal variations of weather elsewhere exercise any influence on the Rhodesian rainfall. It is hoped that the data being collected in this respect will afford useful information in connection with the annual rainfall in the Colony, but to reach a stage of approximate accuracy much work has yet to be carried out.

Chemistry Branch.—The value of this branch of the Department to the farmer cannot be over-stated, and the use now being made of the branch shows that farmers realise that by obtaining an analysis of soils and other advice much dead and useless work and expenditure may be avoided. The Chief Chemist in his report states:—

"The science of agriculture covers a very large field, and in its study embraces many of the modern sciences. It can be understood, therefore, that the science of chemistry in its application to agriculture must necessarily overlap the boundaries, which are to a large extent arbitrary, of the cognate sciences, and that the activities of the Chemical Branch of the Department of Agriculture must be of a very varied character."

This clearly states the position of chemistry in relation to agriculture, and, as has been stated, the work must necessarily be of a varied nature.

A matter which in the past has not received particular attention, but which may produce important results, is the question of the investigation of the mineral content of Rhodesian grasses and grain products. In view of the reported "phosphate" deficiency in many farm crops grown and the importance of mineral elements in the nutrition of stock, this matter is one of the greatest importance to all stock owners in the Colony. It has been proved that malnutrition in animals in many instances is due to the mineral deficiency of pastures. It is hoped, however, to carry out investigations in connection with this important subject, with which the recently appointed Chief Chemist has had much valuable experience.

Forestry Branch.—With the increased acreage being planted to tobacco, the question of afforestation is one which will have to be given a great deal more attention than it has had in the past. In many parts of the country the indigenous timber has been almost entirely cut out, and little effort has been made to replace it. Already tobacco growers are beginning to feel the shortage of timber, and this is likely in a good many cases to be more acutely felt than it is at present. Every farmer would, therefore, be well advised to seriously consider the desirability of planting a certain acreage of exotic trees annually. It must be realised, however, that ground should be suitably prepared for the planting of trees, and dirty land and poor soils are to be avoided. Quick growth is essential, and this is only possible if the plants are given a reasonable chance of getting well away at the start. The Forestry Branch should, if necessary, be consulted as to the varieties most suitable for any particular locality, and care is necessary in this direction, as the planting of the wrong variety may lead to failure and delay.

Full particulars regarding forestry work being carried out in the Colony will be found in the Forest Officer's report. It will be noted from this report that much useful work has been done in protecting valuable timber areas against fires. The effect of this protection will be more noticeable in a few years' time, as it will take some considerable time to remedy the serious damage done by fires in the past. Good work has also been done at the Forest Reserve at Mtao, and a valuable asset is being built up there. The total area of the plantations at Mtao amounts to 360 acres, made up as follows:—

Mtao Forest Reserve ...	300 acres
European labour section	60 acres

At Salisbury and Mtao the demands for transplants and seeds are increasing. As many farmers are growing a large number of trees from seeds, it is evident that very appreciable acreages are being planted, but it is of the utmost importance that a great deal should still be done in this direction to meet future requirements, and, as already stated, farmers, and more particularly tobacco growers, should look ahead and make provision for an abundant supply of timber and wood fuel.

SHEEP EXPERIMENTS.

During the year, with a view to ascertaining how sheep farming is likely to succeed, sheep experiments have been commenced in five districts in the Colony, viz., Melsetter, Rusape - Headlands, Somabula, Bembesi and Plumtree. It is too early to give an opinion as to the result of these experiments, but with care and attention there would seem to be no reason why sheep farming should not be successfully carried on in numerous parts of the Colony. There is no doubt, however, that sheep require close attention; but given this they should prove a profitable undertaking. The breed of sheep used for the Government experiments is the merino, but there are crosses which would no doubt do well, and the fact of merinos being selected for the experiment does not necessarily mean that they are the most suitable or profitable for Southern Rhodesia. It is likely, however, that this particular breed will be found to be most generally suitable from a commercial point of view; but it may be found advisable, if more weight is desired, to cross the merino with some heavier breed.

BRITISH FARMERS' VISIT.

The British farmers touring South Africa were able to devote a short portion of their visit to this Colony. Every effort was made in the limited time available to show the visitors as much of the country as possible. Much interest was displayed by the tourists, and from many expressions of opinion given, the general feeling appeared to be that the country gave much promise from a farming point of view. As a result of this visit a number of new settlers of an excellent stamp have come to Southern Rhodesia and taken up land. Many enquiries have been received with regard to the conditions relating to the acquisition of land and much

good will no doubt result from the visit of the British farmers, many of whom had an intimate knowledge of agriculture and stock. They no doubt realised that the class of settler most likely to succeed would be what might be termed the pioneering settler and those who could use their hands as well as their heads; and if they can encourage this stamp of settler to come out, there should be no anxiety as to the result. In good seasons settlers of this stamp will do well, and in lean years they will hold their own.

NATIVE LABOUR.

This matter was referred to in my last year's report, and it was then stated that labour difficulties were likely to become more acute. Many communications have during the last twelve months appeared in the public press, but it is doubtful whether any really feasible solution has so far been put forward. There is little doubt that the matter is a difficult one, requiring much careful thought and consideration. A satisfactory solution of the difficulties will not be easy, but it would almost seem that the only method likely to give relief would be to obtain more efficiency from the available labour supply.

This view may not commend itself to those who are under the firm belief that there is an abundant native labour supply in the country, and that it only requires strong measures to obtain native labour for all requirements. It will be found on examination of the census figures and labour returns that a very large percentage of the able-bodied native population is working, and even if a greater percentage were available, it is doubtful whether the position would be eased to any appreciable extent. Assuming that this is the position, it seems clear that the natural course to adopt is to obtain more efficient and intelligent work from the supply of labour available. It may be contended that this would be no easy matter, but by example and patient instruction much could probably be done to improve matters. It is well known that the native mind works slowly, and that natives are slow to grasp instructions. On account of this it is necessary for them to be shown and led rather than driven towards efficiency. The sense of responsibility of the native cannot be expected to develop with any rapidity, nor can his intelligence be expected to suddenly reach a high level mark, but there seems no reason why, with careful and capable instruction, the efficiency of the average indigenous farm labourer should not be vastly improved. A cheap and plentiful supply of inefficient labour is never likely to be either satisfactory or economical, and the want of knowledge, energy and intelligence makes labour of that class too costly for the average farmer. It would almost seem, therefore, that farmers would be well advised to strive for a higher standard of efficiency from the native labour supply available, and, as stated, this can only be arrived at by careful tuition. Most people who have had dealings with natives have no doubt realised that they must be shown and not told how to do things, not once, but probably many times. This, of course, means that the employer himself must know how to do things; but as many farmers, in addition to having a knowledge of agriculture, are also capable of erecting buildings and of carrying out the varied and many duties which have to be done on farms, the instruction of the native with a view to obtaining more efficient work should not be a difficult undertaking, and would probably be time well spent. Natives are no doubt realising more and more the value of money, and they will naturally endeavour to obtain employment where the highest rates of pay are offering. It will, therefore, have to be realised that on account of the demand for labour wages are bound to rise, and that the rates paid in the past are not likely to satisfy the requirements of the future. To meet this increase of pay greater efficiency and more intelligent work are essential. Further, it is not unlikely that shorter hours and better housing arrangements will soon be demanded by native labourers on farms.

Farm management may be improving, and more scientific methods of agriculture are undoubtedly being introduced with satisfactory results, but care will have to be taken to see that inefficient labour is not allowed to become the restricting factor of farm economy.

AFRICAN COAST FEVER.

It has been rightly stated that African Coast Fever is a national question, and if this scourge is to be eliminated national co-operation and sustained efforts must be made to deal with it. Every owner of cattle should make a determined effort to assist the Government to rid the country of this disease, which periodically crops up in a most unaccountable manner. Without the closest co-operation of every cattle owner, however, the likelihood is that the disease will always be with us in a greater or lesser degree. It is only to be expected that people suffering heavy losses from this disease must at times lose heart, more especially when they feel that there are people in their neighbourhood who have neglected to carry out their obligations in keeping their stock clean and free from ticks.

It has been stated that irksome restrictions and heavy penalties as a means for dealing with people who have tick-infested cattle will never rid the country of African Coast Fever. It would perhaps be equally correct to state that Government supervision and inspection alone will have no better effect. If these views are correct, it is essential that steps should be taken to find some effective means for dealing with this important matter, and one of the methods most likely to be successful might be for cattle owners themselves to see that cattle in their own districts are clean, and that they are kept clean. By accepting this responsibility cattle owners would not only be protecting themselves, but would pro-

bably be doing more to rid the Colony of African Coast Fever than can ever be expected from stringent regulations, heavy penalties or Government supervision and inspection. Only by loyal co-operation with the Government and combined effort on the part of all cattle owners can it be expected to successfully combat the pest of African Coast Fever.

LOANS FOR FARM DEVELOPMENT AND FOR PURCHASE OF STOCK.

The amount provided for farm development loans, amounting to £25,000, was rapidly distributed, and many deserving applications had to be refused. The repayment of loans granted under this heading has on the whole been satisfactory, considering the failure of cotton and tobacco crops in different parts of the country owing to the excessive rains. Of the original amount of £25,000 distributed, approximately 60 per cent. has been repaid. All amounts repaid, however, have again been distributed. In many cases these small loans have been the means of successfully carrying applicants over a difficult period, and although the amount originally provided was small, numerous hard-working and deserving farmers, who were just on the balance between success and failure, have been seen through a period when a little financial assistance just turned the scales in their favour, with the result that they were able to get through their difficulties successfully.

Applications for stock loans have been rather disappointing, but a good deal of difficulty has been experienced in obtaining a good class of animal, either male or female, and this no doubt accounts for more applications not having been received for loans under this heading. A considerable number of good pedigree bulls have been obtained under the loan scheme, and it is hoped that the coming year may show an appreciable increase in the numbers of animals obtained under the provisions of the funds provided for the purchase of pedigree bulls and dairy stock.

LEGISLATION.

During the year the following Acts affecting the Department have been passed by the Legislative Assembly and promulgated:

Cattle Dip Control Act, 1926;
Fencing Law Amendment Act, 1926;
Game Law Consolidation Ordinance, 1906, Amending Act, 1926;
Noxious Weed Act, 1926;
Animals Diseases Consolidation Ordinance, 1904, Amendment Act, 1926.

Cattle Dip Control Act, 1926.—The object of this Act is to enable the Government to be better informed in regard to the importation and distribution of dip. All vendors and importers of cattle dip are required to keep a record of the kind and quantity of all dip possessed, acquired or disposed of and to show in a book to be kept for the purpose the names of persons to whom dip has been disposed of, and to this end regulations have been framed which require vendors and importers to render all requisite returns to such persons as may be directed. The Act should materially assist the Veterinary Department in their efforts to ensure as far as possible that cattle are regularly dipped.

Fencing Law Amendment Act, 1926.—Under the "Fencing Ordinance, 1904," as amended, the application of the law did not come into operation in any district until specifically applied for on a petition of a two-thirds majority of the land owners in the district. The consequence of this was that if a land owner in a district where the law had not been applied fenced his farm, the owner of the adjoining land, although benefiting by the erection of the fence, was not compelled to contribute to its cost. The new Act applies the provisions of the 1904 Ordinance as amended, is applied to the whole of the Colony, and where fencing is erected, adjoining land owners are required to pay half the cost of fencing erected on the boundaries of their farms.

Game Law Consolidation Ordinance, 1906, *Amending Act*, 1926.—This Act makes it illegal for any person except the owner or lawful occupier of land to shoot at game between half an hour after sunset and half an hour before sunrise. This legislation was passed with a view to preventing, for the purposes of public safety, the practice of shooting game at night with the use of electric lamps or head lights.

Noxious Weed Act, 1926.—Under this Act the following plants have been declared noxious weeds:—Burweed (*Xanthium spinosum*); Mexican poppy (*Argemone mexicana*); dodder (*Cuscuta* spp.—all species); prickly pear (*Opuntia tuna, Opuntia ficus indica, Opuntia monacantha*). Every person responsible under the Act must see that any noxious weeds of these varieties are cleared from lands for which any such person is responsible. The Act makes provision for dealing generally with any noxious weeds which are or which may hereafter be included in the schedule to the Act.

Animals Diseases Consolidation Ordinance, 1904, *Amendment Act*, 1926.—The main object of this Act was to transfer the extensive powers held by the Controller of Stock and Chief Inspector in connection with ordering the destruction of animals from these officers to the Governor-in-Council.

STAFF.

During the year the following appointments have been made in the technical staff of the Department:—

W. Fleming, Stock Adviser.
J. C. Hopkins, B.Sc., Mycologist.
A. Cuthbertson, Assistant Entomologist.
A. D. Husband, A.I.C., Chief Chemist.
R. McChlery, B.A., B.Sc., Assistant Chemist.

Miss Anton, B.Sc., Assistant Chemist.
E. D. Alvord, Native Agricultural Instructor.
E. K. Hunt, District Tobacco Adviser.
B. M. Leffler, District Tobacco Adviser.
T. W. Williams, District Tobacco Adviser.
F. F. Carr, District Tobacco Adviser.
C. O. Jones, District Tobacco Adviser.
H. L. Matthews, District Tobacco Adviser.
H. Y. Hawthorne, District Tobacco Adviser.
G. W. Jones, District Tobacco Adviser.
W. W. Walker, District Tobacco Adviser.
R. P. Roberts, District Tobacco Adviser.

Mr. McKinstry, of the Empire Cotton Growing Corporation staff, has been seconded for duty in this Colony *vice* Mr. I. G. Hamilton, B.Sc., transferred.

The following officers have left the Department during the year:—

G. N. Blackshaw, Chief Chemist.
E. V. Flack, Assistant Chemist.

I again desire to place on record the good work done during the year by all members of the staff. The volume of work to be carried out has increased very considerably, both in the administrative and technical branches of the Department, and on many occasions a great deal of work has had to be undertaken outside the recognised office hours. This, however, has been willingly done, and I have to gratefully acknowledge the sympathetic co-operation and assistance received at all times from the whole staff of the Department.

D. McDONALD,
Secretary, Department of Agriculture.

LIST OF ANNEXURES.

"A"—Statistical Return, 1914 to 1925.

Reports of—

"B"—Chief Agriculturist.
"C"—Dairy Expert.
"D"—Poultry Expert.
"E"—Cotton Specialist, Empire Cotton Growing Corporation.
"F"—Chief Entomologist.
"G"—Irrigation Engineer.
"H"—Hydrographic Engineer.
"I"—Chief Chemist.
"J"—Forest Officer.
"K"—Stock Adviser.
"L"—Mycologist.
"M"—Botanist.
"N"—Editor, *Rhodesia Agricultural Journal.*

APPENDIX.

Report of Land and Agricultural Bank of Southern Rhodesia.

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
Cattle—												
No. of European	341,878	394,856	468,504	532,311	600,447	678,508	772,891	905,040	936,251	993,608	1,003,629	1,006,086
Native...	406,180	445,795	491,522	551,632	610,100	652,776	744,402	845,498	864,894	927,343	1,005,277	1,095,841
Total ...	748,058	840,651	960,026	1,083,943	1,210,547	1,331,284	1,517,293	1,750,538	1,801,145	1,920,951	2,008,906	2,101,927
Total acreage under cultivation as summer crops ...	183,407	202,946	249,038	229,953	205,439	211,094	237,268	228,000	266,607	286,837	334,604	355,481
Maize (European)—												
Acreage ...	167,012	174,647	203,150	192,148	173,313	173,467	186,246	181,729	220,937	231,638	232,947	239,662
Yield (bags) ...	914,926	680,285	938,130	591,722	889,969	1,120,548	1,220,768	662,636	1,505,580	1,080,084	1,041,904	1,393,654
Tobacco—												
Acreage ...	1,370	1,310	1,995	3,247	4,197	7,504	9,531	10,174	9,054	8,003	8,441	13,915
Yield (lbs.) ...	426,423	637,261	910,684	620,171	1,467,612	2,947,627	3,746,982	3,182,359	2,810,781	3,878,460	2,405,940	*5,659,809
Butter (lbs.)—												
Farm	151,916	294,568	221,965	204,886	209,439	294,784	244,761	255,104	292,964	338,343	425,018	393,539
Creameries ...	...	...	...	...	...	..	...	...	282,850	554,206	871,714	1,002,850
Total ...	...	...	...	...	...	...	...	...	575,814	892,549	1,296,732	1,396,389
Exports—												
Maize and mealie meal (bags) ...	205,441	363,349	76,390	252,219	216,348	338,144	513,640	365,139	72,120	790,810	407,585	419,407
Tobacco (lbs.) ...	2,237,580	1,534,883	1,311,411	705,597	896,701	829,608	1,737,473	2,383,284	2,248,375	3,973,832	5,018,774	*2,435,507
Cattle	12	7	12,815	13,221	23,672	27,735	37,285	12,408	23,938	34,841	50,770	60,543
Butter (lbs.) ...	55,041	48,648	75,319	282,336	106,227	125,225	204,678	421,815	277,700	342,759	589,861	560,746

* In connection with the above figures, it should be noted that while cattle, butter and exports are for the calendar year ending 31st December of the year shown, the acreage under summer crops, as also the figures for maize and tobacco, are for the season in which planting was commenced in the year under which the figures are shown, but the crop was not reaped until the following year. Exports, therefore, should be taken as relating to the crop reaped during the year previous to that under which the exports appear.

Annexure "B."

Report of the Chief Agriculturist for the Year 1926.

The year covered by this report has been a period of expansion so far as the operations of the branch are concerned. Amongst new activities may be mentioned the following:—From the 1st June that section of Westacre Creek which for some years had been farmed by the Education Department in conjunction with the Matopos School was sub-divided. The school retains about 350 acres of the land, while the remaining 3,100 acres are vested in the Department of Agriculture. Most of the serviceable buildings fell within the area retained by the school, and the whole farm being in a very undeveloped state, the intervening period has been occupied almost entirely with essential development work. Shortage of labour has proved a handicap to progress, but some 250,000 bricks were made and burnt, and the following buildings have been erected or are under construction: Three tobacco barns with grading and bulking sheds, stabling for 35 cows, dairy, implement shed and dwelling house for farm assistants. All these should be completed early in the new year, after which the erection of storerooms, calf pens, piggeries and other essential buildings can be proceeded with.

On 1st October an Agriculturist for the instruction of natives was appointed to the branch, who, it is proposed, will act as liaison officer between this Department and the Native Department's schools for native development, and with the various missionary bodies engaged in giving agricultural instruction to the native. It is also proposed, as soon as certain preliminary training and investigations are concluded, to organise under this officer a circle of native agricultural demonstrators who will be placed in the reserves for the betterment of native agriculture.

The officer so far has chiefly been occupied in making himself acquainted with the working of the Government schools for native development at Domboshawa and Tjolotjo, in visiting a number of the missions which give special attention to instruction in agriculture and in planning out the work for which he will be responsible.

During the same month ten additional tobacco officers were appointed, and have been designated District Tobacco Advisers, each one being allotted to a section of the country in which there are a considerable number of new and inexperienced tobacco growers. These Advisers have been supplied with motor cars, and their duty is to visit as frequently as possible each month all inexperienced growers within their circle. Owing to the difficulty of obtaining suitable persons in Rhodesia to fill these posts, only one local candidate was appointed; the remaining nine, who are young men with much practical experience of tobacco growing and curing, being brought over from America. As far as can be judged at present, all ten officers are carrying out their duties with ability and enthusiasm, and their timely advice should prove of the utmost benefit to the less experienced growers, of whom this year there are so many.

Staff.—With the exception of Mr. D. D. Brown, Tobacco and Cotton Expert, stationed in Matabeleland, who proceeded on six months' vacation leave on the 1st September, the staff has been at full strength throughout the year. Mr. E. M. Matthews, Tobacco Adviser, was transferred from Salisbury to Bulawayo in place of Mr. Brown, and the latter on expiration of his leave will return to Salisbury.

Principal Crops and Prices.—According to the report of the Statistician, the acreage of land planted to crops was 20,000 acres in excess of the previous year, that under tobacco showing an increase of some 5,000 acres. Maize for grain occupied 239,662 acres, and the yield was estimated at 5.81 bags per acre, which is the fourth highest return obtained within the last 10 years. Leguminous crops grown for green manuring showed good expansion, and occupied over 7,000 acres of land, but 40 per cent. of this area was in the Mazoe and 24 per cent. in the Salisbury districts, which indicates that the sand veld districts, in greatest need of the practice of green manuring, have not yet to any extent adopted the practice. The area planted to ground nuts increased by 1,000 acres, and the average yield of 8.1 bags per acre was fair, but should be still further improved.

On account of the shortage of maize in other parts of Africa, the price for this grain has been satisfactory, while all tobacco of good quality was readily saleable at remunerative figures.

Tobacco Industry.—The acreage devoted to tobacco in 1925-26, namely, 13,915 acres, was an increase of over 5,000 acres in excess of that planted the previous year. The output of Virginia leaf rose to 5,313,186 lbs., or an acre yield of 404 lbs.; while of Turkish leaf the production was 346,623 lbs., with an average acre return of 459 lbs. Growers in 1925-26 were estimated to number about 336.

This year, with the aid of the District Tobacco Advisers, it has been possible to make a careful survey of the expansion of the industry in each district, and in view of the many forecasts made as to the 1927 crop, the following statistical figures are of particular interest:—

Mashonaland.

No. of growers.	No. of curing barns.	Proposed acreage of Virginia tobacco.
532	2,089	29,260

Matabeleland.

149	311	3,740
681 growers	2,400 barns	33,000 acres

The number of growers has thus rather more than doubled, while the acreage expected to be planted increased from 13,915 acres to 33,000 acres. Owing, however, to the absence of mid-December and early January rains, the acreage actually planted for the 1927 crop of Virginia leaf will probably not exceed 18,000 acres, to which may be added about 1,000 acres of Turkish tobacco. It is particularly satisfactory to note that the number of curing barns, namely, one to every ten acres which it was proposed to plant, should be ample for the curing of the crop. On the other hand, farm grading and bulking sheds in Mashonaland are reported to number only 244, and it would thus appear that more than half the growers in Mashonaland have so far failed to provide themselves with these necessary buildings.

The following figures* regarding the imports of Rhodesian tobacco into the United Kingdom during the last four years are enlightening:—

	1923.	1924.	1925.	1926.
Leaf - - -	366,513	681,877	827,728	1,783,831
Strips - -	—	36,323	166,135	83,564
	366,513	718,200	993,863	1,867,395

Gwebi Farm.—The year has been mainly occupied in carrying out the previously agreed to development programme, and a stage has been reached when the farm is equipped to receive more pure-bred live stock of all descriptions. Building and other developments were principally carried on by the farm staff aided by two European builders, and to some extent conflicted with the ordinary operations of the farm, to the detriment of the revenue derived from crops.

The Farm Manager reports that 559 acres were under crops, and besides a proportion of the maize crop fed to stock, 110 acres of land were sown to other crops for stock feed, while 36 acres were green manured, and 200 tons of veld hay was made.

The Friesland herd has continued to do particularly well; during the year the natural increase was 18 head, bringing the total herd to 59, of which the following are pedigree animals:—1 herd bull, 3 young bulls, 3 bulls under 1 year, 10 cows and 8 heifers and heifer calves.

Deaths during the year numbered two, both being due to quarter evil. The one pedigree cow which died was 13 years old.

The grade Shorthorn herd has not so far proved satisfactory, the cows requiring a good deal of extra feeding in winter and giving little milk. The herd numbered 60 at the close of the year.

Sheep flocks were increased by the purchase of pure-bred blackhead Persians from Mr. Montagu Gadd and by a most acceptable draft of 1 merino ram and 25 ewes very kindly donated to the Department for experimental purposes by Major Beamish of Mooifontein, C.P. The ram on arrival clipped a fleece weighing 20 lbs., and the ewes gave an average clip of 7 lbs. each.

The flocks numbered around 200 throughout the year, and the total mortality was 2.5 per cent. Ninety hamels, lambs and culled ewes were sold for slaughter.

The Middle White-Large Black cross for bacon pigs continued to do well, and 45 pigs of this cross were marketed. No cases of sunscald occurred. Pure-bred Middle Whites were also kept.

The following building and development work has been carried out during the year:—A small house for the Farm Manager, quarters for three married settlers, conversion of the single students' quarters to accommodate two married settlers with families, the original pigsties and lean-to implement shed converted into 21 calf pens, the main implement shed and grain store converted into byres to hold 65 cows, with three calving boxes and two bull boxes; also a large brick under iron grain store, and iron implement shed, four jackal-proof sheep paddocks, each 25 x 100 yards; sub-division of the east side of the farm by 4-strand fences into eight paddocks, each of about 90 acres; the sinking of two boreholes by the Government drill; the construction of eight brick and cement drinking troughs, one in each of the paddocks; the fencing off of two small paddocks for calves; the fencing off of the orchard and vegetable garden; the building of a footbath for the sheep, and the planting out of 20,000 gum trees in shelter belts and plantations.

Eight settler families have been in residence during the year, and have received practical instruction in all the operations of the farm.

Tobacco Experiment Station.—In 1925-26 42 acres of land on this station were under crop, 32 acres being planted to tobacco and the remainder to maize and other rotation crops. The return, in spite of some angular spot, was satisfactory, a final weight of 15,700 lbs. of leaf being recorded. The crop was graded on the station by the apprentices working under the direction of the Manager, the weight of grades obtained being as follows:—

Brights and bright strips	3,500 lbs.
Mediums and medium strips ...	6,700 lbs.
Darks	700 lbs.
Fire-cured	2,000 lbs.
Samples taken for local shows and London Office	400 lbs.
Scrap	2,400 lbs.

An all-over price of 1s. 5d. per lb. f.o.r. Salisbury was obtained, a good result in view of the many different varieties being grown and the different treatments accorded to different fields.

Forty acres are planted to tobacco this season, and 20 acres to rotation crops, some 15 acres of new land having been stumped and ploughed.

* From Monthly Tobacco Report of Frank Watson & Co., Ltd., Liverpool, 1st January to 30th November, 1926.

The Manager reports that 200,000 bricks were made, and the following buildings erected: — One standard size flue barn equipped with Johnson patent furnace; one fire-curing barn 25 x 16 x 18 feet; matron's quarters (2 rooms); dining hall and 6 bedrooms for apprentices; laundry room; bathrooms and sundry offices. The boundary fence of the station was completed, and 1,600 yards of paddock fencing was erected.

One apprentice left the station during the year and 15 new apprentices joined, making a present total of 20. Each two apprentices have half an acre of tobacco on which they themselves have done and do all the work unaided by native labour.

Six Friesland cows were purchased for the station, and apprentices take duty turns in tending, feeding and milking these and in hand-rearing the calves. A number of lectures on various subjects have been given to the apprentices by the technical officers of the Department.

The station was inspected by over 500 visitors during the year.

Salisbury Experiment Station.—Work has been successfully continued under the management of Mr. H. C. Arnold. The season was not a very favourable one and crop yields were lower than usual, but this did not detract from the valuable additional knowledge of crops and soil treatment annually accumulated at this station. During the year several new lines of investigation were commenced, notably in connection with the incorporation of heavy types of tobacco in rotations adapted to the soils of the maize belt; also in regard to the most economical applications of farmyard manure alone and reinforced with phosphatic fertilisers.

Fifty-seven new crops or new varieties of crop were introduced and tested. Free issues of seed and plants to farmers in this Colony numbered 246, and 75 issues were made to experimental institutions in other countries.

Two hundred and ten visitors were shown over the station during the year.

Most members of the British, Irish and Dutch farmers who toured Rhodesia visited the station. An admirable display of all the crops grown there and the products locally derived from each was attractively staged by the staff, and aroused much interest amongst the visiting farmers.

Bulawayo and Gwelo Demonstration Stations.—Continued good results may be recorded for both these stations, which it is believed, so far as crop growing is concerned, have exerted an encouraging and helpful influence throughout the areas which they serve. The work is under the immediate control of Mr. L. Babb and Mr. W. Hopkins, the respective commonage rangers of the two municipalities. Both gentlemen have carried out their duties with keenness and great ability, and the success of their efforts is reflected in the satisfaction with which the work of these stations is regarded by their own municipal authorities. Visits by local farmers to both stations were fairly numerous, but there is still room for improvement in this direction.

Maize Grading and Export.—The grading season commenced on the 15th July, and on the whole fewer difficulties were experienced in regard to excessive moisture than in the previous year. Conditions during July and August were difficult, however, and in order to expedite railings it was necessary to grade only the upper bags in stacks, leaving the lower bags to dry out further. It is satisfactory to record that very little friction occurred between farmers and the graders, but the Senior Grader in his report comments on the very small proportion of farmers who are able accurately to judge either the grade or the moisture content of their maize.

As a result of recommendations made at the Maize Export and Grading Conference, the following additions and amendments to the export regulations were introduced during the year: —

(a) A fourth grade, viz., No. VIII., which includes all grain which cannot be placed in a higher grade, but which is dry and fit for shipment.

(b) For export purposes the use of none but 2½ lb. "A" quality 8 x 8 bags.

(c) The sewing of all bags without lugs.

The Chief Port Grader at Beira reports that the wastage of Rhodesian maize in the trucks and on the wharves has, thanks to factors (b) and (c) above, been very much less than ever before.

One permanent up-country grader was employed, and four temporary graders for periods varying from three to seven months. In addition, all maize passing through the port of Beira was examined there by the Chief Port Grader.

A total of 548,601 bags of maize and 14,480 bags of maize meal was graded, the percentages of the different grades being as follows: —1st grade, 1.5 per cent.; 2nd grade, 93.3 per cent.; 3rd grade, 3.7 per cent.; grade VIII., 0.4 per cent. For one reason or another 1.1 per cent. of the total number of bags examined for export was rejected.

The maize crop, as estimated by the Government Statistician, amounted to 1,393,000 bags, and the following particulars of the railings of this crop for export are kindly supplied by the District Traffic Superintendent, Salisbury: —

Destination.	No. of bags railed.
Beira	140,764
South African Union	284,294
Northern Rhodesia	5,713
Congo	6,352
Nyasaland	13,301
	450,301

Horticulture.—Mr. Marshall, Horticulturist, has completed his first year of service in the Department, and during the period has

visited 338 private farms and has acquainted himself with the conditions in almost every district of the Colony. Commenting on our fruit possibilities, this officer reports:—"The prospects for commercial deciduous fruit growing along the eastern border are bright; apples and pears, together with many other fruits, doing extremely well. Walnuts and possibly peccan nuts should be planted extensively in these districts. The high veld of Mashonaland as a whole is fairly well suited to most of the deciduous fruits, and near Salisbury the peccan nut is bearing very heavily. Almonds are most promising in the Midlands, and commercial plantings are being commenced. In several localities, notably Umtali, portions of the Mazoe Valley and around Gatooma, tropical fruits show great promise, and it should be possible to develop commercially some of these, particularly the paw paw, custard apple and Avocada pear. One grower near Gatooma is already producing papain in a small way."

As regards the citrus industry, he states that it is unfortunate that many of our commercial orchards have been established on heavier soils than are best for these fruits. There are 150,877 bearing trees in the Colony, and 50,304 not yet bearing. The excessive rains of 1925-26 caused much blemishing of last season's crop, and export was reduced from 74,000 boxes in 1925 to 41,344 boxes in 1926. Of this number 39,500 boxes were shipped *via* the Cape to England, while 1,844 boxes were sent in trial consignments *via* Beira to England, Egypt, India and Palestine with highly satisfactory results so far as the carrying of the fruit was concerned.

The citrus prospects for 1927 are excellent, there having been a very fine "set" of fruit particularly free of blemish.

Coffee and Tea.—The work on these two crops, chiefly in the Melsetter and Umtali districts, referred to in my last annual report, has been continued. Seed of *C. robusta* varieties has been introduced and distributed, but the utmost difficulty has been experienced in retaining the viability of imported seed in view of the severe treatment accorded it here in order to destroy the insect pests which it harbours. In the case of the first introduction, only a very small percentage of berries germinated, while with a later and larger introduction, almost every berry was infested with the dreaded *Stephanoderes* borer, and virtually the whole consignment had to be destroyed. In spite of these difficulties coffee growers in the districts referred to have been enabled to procure *robusta* plants, from which by 1930 they should be obtaining good supplies of seed for further planting.

From the tea seed distributed a few Melsetter farmers have been able to raise sufficient plants to test this crop on a small scale. The principal experiment with tea is being carried out in the Tanganda valley by Messrs. J. and A. Ward, the latter of whom, from his experience of tea in the East, expresses himself highly pleased with the quality and flavour of the tea produced in Melsetter, and very satisfied with the prospects.

Farmers' Tour.—One of the occasions of the year was the tour of the British, Irish and Dutch farmers through Rhodesia. The party was met by the writer at Sandown, their first stop in this Colony, and thereafter the arrangements for their reception and daily tours were guided by local committees at each chief centre visited. Different officers of the Department accompanied the party during different stages of the tour. Considering the short time allowed them in Rhodesia, the Colony was well quartered by our visitors, who for the most part were enthusiastic of the opportunities which the country offers for settlement and expansion.

Agricultural Surveys.—Mr. Mainwaring and the writer carried out flying agricultural surveys of four areas into which it was thought railway extensions might be pushed. The object of these surveys was to ascertain the present and potential agricultural production of the areas which would be served by the suggested branch lines, and in this work great assistance was rendered by many of the farming residents.

Sugar Cane in Wankie District.—Accompanied by Mr. F. D. Thompson, who has wide experience of sugar growing and milling, the Chief Agriculturist visited and inspected the unirrigated fields of sugar cane on Mr. P. D. Crewe's estate in the Wankie district. The cane has been established on several of the extensive black basalt vleis occurring so frequently in that area, and from the trials already made there seems good reason to believe that cane can be grown successfully on a commercial scale in this district unaided by irrigation.

Agricultural Shows.—One or more officers of the branch attended each of the agricultural shows held, and at the same time judged in produce and other sections. Exhibits of an educational nature drawn from the Government Experiment Farms and Stations were staged at each show. The Government pavilion on the Salisbury show ground to house the Departmental exhibits was considerably enlarged and improved, and a somewhat similar but rather smaller one was commenced on the Bulawayo show ground.

Tours of Professional Officers.—These continued to be organised by the Chief Agriculturist after a circular letter had been sent to all farmers' associations inviting them to apply for visits by those officers of whose services they were most in need. A number of associations failed to take advantage of the invitation, but 38 did so, and arrangements were made well in advance for the attendance of officers at meetings of each association. Usually a farm tour was combined with a lecture to the association, and generally each association which replied received visits from not less than three to four different specialists during the year.

General.—The Chief Agriculturist, or as alternate Mr. Mainwaring, served on the

Development Loan Committee, and both these officers carried out a number of farm inspections in connection either with development loans or loans from the Land Bank. All other officers of the branch also made inspections on behalf of the Development Loan Committee.

Legislation.—The Noxious Weed Act referred to in my last report was passed by the Legislature, but has not yet become operative.

Extension Work and Farm Tours and Inspections.—The Chief Agriculturist devoted 165 days to this work. Twelve visits of inspection were made to the Tobacco Experiment Station, 14 to the Gwebi Farm, 3 each to the Bulawayo and Gwelo Experiment Stations, 16 to the Agricultural Experiment Station, Salisbury, and 5 to the Government Farm, Matopos. In addition, 122 private farms were visited in the following areas:—Bulawayo, 15; Gwelo, 18; Selukwe, 1; Umzingwane and Matobo, 11; Wankie, 4; Insiza, 4; Salisbury, 16; Enterprise, 7; Marandellas, 10; Macheke, 5; Enkeldoorn, 2; Hartley, 17; Lomagundi, 12. Addresses were given at five farmers' association meetings.

Mr. Mainwaring, Agriculturist.—Spent 170 days out of office, and during this period visited 134 farms in Mashonaland and 93 in Matabeleland, namely, Gwelo, 15; Plumtree, 10; Figtree, 8; Bubi, 13; Nyamandhlovu, 36; Matobo, 11; Hartley, 56; Victoria, 19; Salisbury, 12; Mazoe, 8; Headlands, 11; Rusape, 15; Marandellas, 13. Thirty-six days were devoted to inspecting and reporting on the agricultural potentialities of certain areas which it was thought might justify railway extensions. Nine lectures were given before farmers' associations, three to the apprentices at the Tobacco Experiment Station, and six articles were prepared and published in the *Rhodesia Agricultural Journal.* Inspections of the Gwebi Farm, Tobacco Experiment Station and Inyanga Estate were made, and also of the Gwelo Small Holdings, and of a number of private farms on behalf of new settlers.

Mr. Hilliard, Assistant Agriculturist.—This officer spent 139 days out of office, including short periods occupied (a) in reporting on the crops at the Bulawayo and Gwelo Experiment Stations, and (b) in maize grading. He visited 164 farms in the following districts:—Salisbury, 8; Enkeldoorn, 13; Marandellas, 28; Mazoe, 20; Hartley, 14; Makoni, 24; Gwelo, 39; Bubi-Umzingwane, 12.

Mr. Marshall, Horticulturist.—Devoted 194 days to extension work. He visited 338 farms, located as follows:—Hartley, 8; Lomagundi, 14; Mazoe, 41; Mrewa, 3; Melsetter, 63; Marandellas, 31; Makoni, 12; Salisbury, 56; Umtali, 20; Victoria, 21; Gwelo, 12; Selukwe, 3; Bulawayo, 21; Bulalima-Mangwe, 14; Insiza, 8; Nyamandhlovu, 3; Umzingwane, 8. In the course of these tours 16 farmers' association meetings were attended, and 12 lectures and 3 field demonstrations were given.

Mr. Newton, Tobacco Adviser, Salisbury.—Spent 224 days out of office and visited 370 farms in Mashonaland, attending at 20 meetings of farmers' associations. The farms visited were as follows:—Hartley, 69; Lomagundi, 54; Mazoe, including the Umvukwes, 102; Makoni, 37; Melsetter, 12; Marandellas, 11; Salisbury, 78; Umtali, 9.

Mr. Matthews, Tobacco Adviser, Bulawayo.—Devoted 234 days to extension work, during which he visited 135 farmers in Mashonaland, 244 in the Midlands and 77 in Matabeleland. In some cases the same farm was visited more than once. Visits by this officer were as follows:—Salisbury, 34; Marandellas, 26; Charter, 34; Hartley, 25; Makoni, 13; Mazoe, 3; Gwelo, 156; Victoria, 26; Chilimanzi-Gutu, 57; Selukwe, 5; Bulawayo, 15; Gwanda, 12; Nyamandhlovu, 6; Bubi, 9; Bulalima-Mangwe, 6; Insiza, 3; Matobo, 4. Thirteen meetings of farmers' associations were attended, and 15 lectures were given to agricultural bodies.

Mr. Brown, Tobacco and Cotton Expert.—Also paid a large number of farm visits in Matabeleland previous to proceeding on leave at the end of August.

District Tobacco Advisers.—These officers in the course of their farm to farm visits are covering an average mileage of 800 to 1,000 miles a month. The number of growers in each section is as follows:—Area No. 1, Umtali, 49; area No. 2, including the Umvukwes, 99; area No. 3, including Marandellas, 115; area No. 4, Lomagundi, 79; area No. 5, Salisbury, 129; area No. 6, Gatooma, 61; area No. 7, Gwelo north, 51; area No. 8, south Midlands to Heany Junction, 20; area No. 9, Umvuma, 48; area No. 10, remainder Matabeleland, 30. In some areas, particularly in Matabeleland, growers are very widely scattered, and on this factor naturally depends the number of farms the local adviser is able to visit each day.

H. G. MUNDY,
Chief Agriculturist.

Annexure "C."

Report of the Dairy Expert for the Year 1926.

Dairying Season, 1926.—The dairying season of 1926 was characterised by rainfall above normal during January, February and March. From March onwards, however, to the end of the year the rainfall was below normal. The winter was cold, and cattle generally were in poor condition at the beginning of October.

The cold winter and the fact that most winter feed had been consumed caused a serious falling off in supplies of milk and cream during October, November and the first half of December, and this affected the total production of dairy products, which at one time promised to be a great advance on that of 1925. The falling off, unfortunately, in the last quarter of the year was so serious that for a short time it was necessary to re-import both butter and cheese from the Union. Nevertheless, the production of butter for the year constitutes a record, and shows an advance of almost 18 per cent. on our previous record year, 1925.

The cheese production suffered because of the fact that very little cheese was made from July to the middle of December. The shortfall, however, when compared with the previous year's figures, is almost negligible.

Dairy Legislation.—The Dairy Produce Act of 1925 came into operation on the 1st January, 1926. The operation of this Act has extended the scope of the duties of officers of this division, because inspection duties and the checking of grades and tests of cream sent in by farmers to the various creameries have necessitated a good deal of extra work and extra travelling. It is to be hoped that the application of this Act will create a greater degree of confidence between creameries and cream suppliers and that it will do much to place the dairy industry on a sound basis. At the same time the application of this Act will tend to raise the standard of our dairy products. This will be essential if, as appears likely, Southern Rhodesia is to compete in the overseas markets, where the older Colonies and other countries have so firmly established themselves.

Dairy Stock.—It is gratifying to be able to report that improvement in the breeding and condition of dairy stock continues to be made. Better bulls from a recognised milk strain are in constant demand, and the services of the newly appointed Stock Adviser are enlisted to this end. The Friesland breed continues to be the most popular of our milk breeds, largely because of the ease with which bulls can be obtained and because of the fact that the enlightened policy of the Friesland Cattle Breeders' Association in sending cattle to our shows to be sold without reserve has begun to bear fruit.

Other milk breeds such as the Ayrshire and Red Polls are also in demand, but at present the number of good animals of these breeds available either in this Colony or in the Union is extremely limited, and prices are as a rule high. Animals of these breeds thrive especially well on our lighter soils, and their more general adoption where opportunity offers is greatly to be recommended. Farmers, however, are not supporting the Government loan scheme for the purchase of dairy stock to the same extent as was anticipated, and there seems to be a regrettable tendency to disregard the more reliable system of "mixed farming" for the more speculative one crop system, e.g., tobacco or maize growing, and to look upon dairying as a mere side-line.

The treatment of dairy stock continues to receive attention, and although some improvement in this respect can be seen, yet this improvement is slow. Although in some cases a good revenue is derived from dairy stock, very little is done to improve the conditions under which the cows are housed and milked. The calves are often neglected and the cows milked in an open kraal, with all its attendant discomfort in wet weather. The attitude of such farmers is difficult to understand, because in practically all cases they are fully aware of the benefits to be derived from a milking shed and from the common sense treatment of calves.

Fencing, both of boundaries and paddocks, is urgently required on most farms. The expenditure on wire is easily recoverable by the increased return from milk and cream and the saving effected by the lack of necessity of employing so many herd boys. Where dairy cows are kraaled at night they cannot possibly do themselves justice, as it is unnatural for them to graze in the heat of the day. Every effort, therefore, should be made to provide at least one paddock in which animals can graze under natural conditions.

The treatment of calves does not yet receive sufficient attention. It should be remembered that the heifer calves constitute the future generation of dairy cows, and the provision of clean warm shelters and some dry concentrate mixture, such as mealie meal, bran and nut cake, in addition to the milk, will be money well spent.

The demand for locally bred dairy females is constant, and farmers who, because of their distance from the rail, cannot take up dairying should cater for this demand. Good grade dairy heifers and cows are being freely sold at from £15 to £20. This is certainly more remunerative than breeding bullocks at from £4 to £8 apiece.

Milk Recording.—The Rhodesian milk recording scheme is gaining further support as the necessity for fuller information as regards milk production in the breeding of bulls is more appreciated. The cost of milk record-

ing in Rhodesia is negligible, but the fact that such records are available puts anything from £10 to £30 on to the value of a bull. The number of herds recorded during 1926 stands at 18, and the number of cows recorded is 112.

In order to encourage a greater degree of accuracy in the compilation of records, daily weighing books are being issued to farmers free of charge. The daily weighing and recording of milk produced per cow certainly constitutes a tie, but it is only where daily weighing is practised that we can hope to have our records recognised as official. Negotiations with this object in view are being conducted with the Friesland Cattle Breeders' Association. Although milk recording in Southern Rhodesia has proved that, with good cows and careful handling and feeding, high-producing qualities are possible, yet the average milk production is still abnormally low. Better bulls and better treatment of young stock are essential if our average return per cow is to show an increase. At present it is feared that the tendency generally is the reverse, as farmers are only too apt to indulge in the practice of underfeeding and over-milking. The young stock are suffering in consequence, and of course the effect of the practice is cumulative as one generation of stock succeeds another.

Creameries.—The number of creameries required to be registered under the Dairy Produce Act stands at the same number as last year, viz., seven. Each of these creameries has had a successful year, and in practically every case their production of butter constitutes a record. Perhaps the most noteworthy increase is in the case of the Farmers' Co-op. Creamery Depot, Salisbury, where the quantity of butter fat received shows an increase of practically 50 per cent. on the previous year's figures.

The amount of cream received and the bright prospects of Mashonaland as a dairying country justify the initiative of the board of directors of the Farmers' Co-op. in establishing this depot four years ago and equipping it with a hand churn for the production of butter for local consumption. Since this modest beginning this creamery has shown marked expansion year by year. It is now equipped with a power churn and small cold storage, but these facilities are now too limited to cope with the ever increasing supplies of cream, and it is to be hoped that provision will be made for a greatly needed equipment more capable of manufacturing butter for the overseas market. In this connection it is interesting to note that a large portion of a consignment of butter sent to London during the year was manufactured at the depot and that this butter obtained a good report from the London agents.

The expansion of this creamery has only been made possible by the development of dairy farming in Mashonaland, and it is noteworthy that, in addition to the production of the major portion of the cream in Southern Rhodesia, Mashonaland has produced practically all the cheese manufactured in the country.

The Gwelo Creamery has also had a record year, and it is pleasing to note that the extensions recommended in the annual report for 1925 have now been carried out. New cold storage rooms have been built and the creamery building itself has been extended and more suitably equipped.

The Rhodesia Co-operative Creameries, Ltd., Bulawayo, has also had a most successful year and is now in a sound financial position.

The Model Dairy, Bulawayo, after another successful year's working, has also been extended and well equipped. Further extensions are contemplated in the near future, and it appears that the expansion of business well justifies these projected improvements.

The smaller creameries, such as Kay's Creamery, the Royal and Vailima Dairies, Bulawayo, and the Lal Bagh Dairy, Gwelo, also have been extended and more fully equipped.

All these extensions, involving large expenditure of capital, are justified by the expansion of the dairy industry and point to the fact that this branch of agriculture is now firmly established in the Colony and that the prospects for the future are most promising. The price of butter fat throughout the year has remained firm and has ranged from 1s. to 1s. 9d. per lb. for butter fat of first grade quality. Many farmers who hitherto have made butter have adopted the practice of sending cream to the various creameries. In consequence, the production of farm butter in the country shows a slight diminution from year to year. This is a movement in the right direction, as it is only by the efforts of our creameries, co-operative and otherwise, that we can expect the expansion and development of the export trade both overseas and to adjoining countries.

The production of creamery butter for the year reached the record total of 1,175,000 lbs., thus exceeding the previous year's total by almost 17.5 per cent. The creamery production for 1922 was 280,000 lbs., so that almost exactly four times as much butter was made in 1926 as in the year 1922. The total quantity of butter exported to our various markets was 774,961 lbs., of a value of £55,537. These figures also constitute a record for Southern Rhodesia and show a percentage increase over the 1925 figures of 38 per cent.

Cheese Factories and Cheese-Making.—Progress in cheese-making is still being made, and during the earlier part of the season £800 worth of Rhodesian cheese was exported to the Union. Unfortunately, owing to the prolonged dry season, many factories ceased manufacturing cheese in July and did not open again until December. The total production suffered accordingly and was further restricted by the closing of two fac-

tories and the establishment of only one small factory to take the place of those already closed. Each of the factories in full working showed, however, an increase in output over last year's figures, although, as has been stated, the aggregate of production was slightly less.

Markets for Rhodesian cheese were found in the Union, the Congo, Northern Rhodesia, Portuguese territory and Nyasaland. The price, however, was affected by over-production of cheese in the Union, with a consequent lowering of values.

The quality of Rhodesian cheese continues to show improvement, although in some factories better cheese curing rooms and better conditions in the making rooms would further add to the improvement which has been noted in previous years. The establishment of a larger central storage station, where cheese could be graded and stored during the scarce season, is urgently required. The storage of cheese under conditions of controlled temperatures is especially necessary from the beginning of September until the end of November, and it is gratifying to learn that plans to provide this necessary storage are likely to be considered in the near future.

The total production of farm-made cheese during 1926 approximates to 130,000 lbs. No cheese at present is made in the Co-operative Creameries, owing to the difficulty of obtaining a sufficiently large quantity of milk to justify the employment of a full-time cheese-maker.

Milk Supplies to Towns.—Milk supplies to towns have been plentiful for practically the whole year. There was, however, a slight shortage in Bulawayo during November, but the extension of the radius from which milk can be obtained has been made possible by the employment of motor transport. The shortage, therefore, was of short duration and is not likely to recur.

The conditions under which milk for urban consumption is produced have been greatly improved by the application of the Dairy Ordinance to practically all urban centres. Impervious floors and good drainage have been provided in all cow stables to which the Dairy Ordinance applies, and periodical inspection by officers appointed by the Public Health Department has done much to put our town milk supplies on a satisfactory basis.

Activities during 1926.—

Farmers' associations addressed ...	25
Lectures and practical demonstrations	30
Farms visited	425
Shows attended	6

Statistics Showing Comparative Returns, 1925-26.—

	1925.	1926.
Creamery butter in lbs.	1,002,669	1,177,585
Farm-made cheese in lbs.	130,768	130,000
Butter exported in lbs.	560,746	774,961
	(Value £41,611)	(Value £55,537)

The Pig Industry.—The pig industry continues to expand as an adjunct to dairying. Better pigs are being reared, and generally there is little reason to complain of the quality and breed of pig received at our principal bacon factories. Farmers, however, are apt to err in sending pigs which are underweight, and the keeping of the animals for an extra month or two would be advantageous both to themselves and to the bacon curers.

The most popular bacon pig still seems to be the Berkshire-Large Black cross, but many farmers are breeding Large Black pigs pure with excellent results. The Middle White-Large Black cross also is gaining popularity as an early maturing animal and finds favour with the bacon curers. Rhodesian bacon still enjoys local popularity and finds a ready market in the Union and our neighbouring countries. Each of our two bacon factories has been well supported throughout the year. At the same time a large number of Rhodesian pigs is exported to the Union, the Congo and Northern Rhodesia. This export is, of course, mainly from Matabeleland and seems to be increasing, as the average number per month despatched is 300 animals in 1926, as against 250 per month in 1925.

Total Production of Pig Products.—The total of pig products in the country as given by the bacon factories is as follows:—

Bacon and hams	565,606 lbs.
Other products (lard, sausages, etc.)	161,189 lbs.
Total	726,795 lbs.

This total shows an increase for 1926 of 34,303 lbs. as compared with the 1925 figures, or 5 per cent. increase.

No figures are as yet available to show the amount of farm cured bacon produced during the year under review.

T. HAMILTON,
Dairy Expert.

Annexure "D."

Report of the Poultry Expert for the Year 1926.

General.—The work of this Division is almost solely of an advisory and educational nature, and includes grading, culling and mating of poultry for farmers and poultry keepers. Advice by correspondence and bulletins is also extensive. Efforts are always made to induce farmers and poultry keepers to keep only paying birds and to treat them rightly in order to make them a profitable side-line and bring in a good monthly cheque. In a number of cases this is achieved, but even yet much kindergarten work has to be carried out, owing partly to new settlers coming into the country who know nothing about poultry keeping, but chiefly it is due to lack of proper application, attention to the fowls, common sense and not following advice given on the part of those who have been keeping poultry for some time. This constant reiteration of advice and other elementary work prevents the carrying out of research and experimental work so necessary, and which now after nine years' teaching should be possible. However, there is an improvement in many ways, but not to the extent there should be, and it is more among a number of individuals than collectively.

Eggs.—The production of eggs is the chief object of poultry keeping in this Colony, and it increases each year; but even yet the difference between those produced in the scarce and plentiful seasons is much too great, with the result that prices vary considerably. This difference could be largely overcome if poultry keepers would follow the advice given to obviate it, and that it can be so is shown by the results of the egg laying test.

Unfortunately there is not really adequate means for conserving the surplus eggs successfully during the glut for sale during the scarcity, and eggs are being imported into this country during the latter period. One of the endeavours of this branch has always been to lessen the imports and increase the exports; this was achieved each year up to 1924, but since then the contrary has been the case.

Table Poultry.—This shows an improvement; the demand for good table poultry is greater. The public are beginning to realise that a well fed fowl, although the price per lb. may be higher, is more economical, more nutritious, than are the native fowls, previously so often consumed. The prices for fowls, ducks and turkeys obtained are in the majority of cases quite remunerative to the producer and fair to the consumer.

This branch of the Department has endeavoured to persuade poultry keepers to go in for caponising more than they do, to the benefit of themselves and the consumer. A large number of lessons on caponising were given, a bulletin describing the operation in detail was issued, and numbers of birds were by request operated on by the Poultry Experts, but since a small fee was charged for this work the requests have dwindled to nil, and little caponising is now done.

Sale of Breeding Stock and Eggs for Hatching.—The demand for these increases year by year and good prices are obtained, especially by breeders who go in for trap-nesting or single pens, and are thus able to give particulars of pedigree and egg recording.

Lectures and Demonstrations.—These are usually given at farmers' association meetings and are usually fairly well attended. The latter are constantly being given on farms and on poultry keepers' premises.

The Itinerary Work of this Division is very extensive. Nearly every farmer keeps poultry, in addition to poultry breeders proper —those living on plots and householders in and around towns. All request personal visits for grading, culling, mating and any advice on the spot, but it is obviously impossible to visit all even once a year (and many ask for visits two or three times a year), in addition to carrying out the other work of this Division. I can confidently say that more visits are paid by the Government Poultry Experts in this Colony than those paid by any other poultry division pro rata in the world, and also more assistance and advice are given. I do not think the majority of farmers and poultry keepers in this Colony realise this. New settlers have stated that this is also their experience in poultry husbandry and in agriculture generally.

Poultry Shows.—These were held in conjunction with all agricultural shows. A young bird poultry show was held in March, the first of its kind in Rhodesia, and was a distinct success, both with regard to the number and quality of birds and sales, both at the show and subsequently. The majority of birds at these shows are judged on utility points, and this side of the industry (that is, the commercial) is more catered for than the fancy. Most of the exhibits at these shows were of better quality and in better condition than those of the previous years, and it is gratifying to see that, taking them all round, there is an improvement each year. Notwithstanding this, these shows are not patronised to the extent they should be by the poultry breeders who have a large number of birds, and birds of good quality.

The Departmental Exhibit.—This was staged at all the shows. It is impossible, however, to stage the full exhibit at all. At Salisbury Show obviously only can the latter be on view, and here it was most instructive

and comprehensive and attracted a large amount of interest. A new feature was the exhibit of birds of good laying and bad laying type of different breeds side by side. If all poultry keepers who visited the exhibit were to study it well and follow the instructions given there would be no necessity to give them further advice or assistance, for it covered the whole range of poultry keeping from A to Z.

Seventh Annual Egg Laying Test.—This commenced on 1st March, 1926, and terminated on 30th January, 1927. There were more entries than pens available, and places had to be balloted for. There should be many more entries than there are, and especially from the bigger breeders; but these, who as a rule have good sales for breeding stock, etc., rather fear that if they do not take a high position their sales would be affected. Egg laying tests all over the world are now most popular; they create a spirit of competition and rivalry and are of immense benefit to poultry breeders and the industry generally, in that they encourage the breeding of better and more productive birds, give an official record of eggs laid (and size) by each bird, thus enabling the owner to know what he is breeding from.

This test also provides an excellent demonstration on feeding, housing and general treatment of what should be adopted for best results under Rhodesian conditions—a demonstration which is not taken advantage of as it should be by poultry breeders. The results have each year shown an increasing improvement and higher records. The feeding and housing are such that any farmer in the country can adopt with ease.

Literature.—In addition to articles in the *Rhodesia Agricultural Journal*, many articles have been written for the *South African Poultry Magazine* and the *Rhodesian Poultry Magazine;* also articles for distribution, not published in the above.

Diseases.—These, it is gratifying to record, are on the decrease, chiefly due to care and watchfulness, the elimination of fowls seriously affected, better housing and hygiene, and advice with regard to prevention being more generally adopted by poultry keepers. As an instance of this, of the birds now exposed for sale at the Salisbury Saturday morning market, very seldom indeed are there any that are diseased. The fowl tick producing the disease Spirochœtosis (similar to African Coast Fever) is being—at any rate in Mashonaland—stamped out; in Matabeleland, unfortunately, its elimination is not so rapid. It is the greatest insect poultry scourge in South Africa, and time alone, with constant work, will eliminate it.

I have much pleasure in testifying to the excellent and conscientious work of the members of my staff.

ARTHUR LITTLE,
Poultry Expert.

Annexure "E."

Report of the Cotton Specialist for the Year 1926.

Despite the partial failure of the cotton crop the previous season, 1924-25, an even larger acreage was planted in the spring of 1925 in the hope that it would turn out to be a dry year. Such hopes, unfortunately, were not fulfilled, with the result that cotton has again to be recorded as almost, if not quite, a failure. The yields per acre, it is true, show a slight increase, being 124 lbs. per acre, as compared with 93 lbs. per acre the previous year. These figures are obtained from actual returns made by farmers. If, however, the returns received from the various ginneries are divided by the number of acres planted, the average yield per acre is increased to 135 lbs., which is a distinct advance on that of the 1924-25 season. Even this figure, however, falls far below the average yield per acre obtained in 1923-24, viz., 428 lbs. The total amount of cotton received at the ginneries amounted to 8,974,898 lbs.

Compared with the two previous seasons, planting rains were late in arriving, and this may account to some extent for the behaviour of the crop in the autumn, when many fields which gave indications of fair to moderate crops yielded very little cotton owing to the failure of the bolls to open properly. This is a point to which further reference will be made later.

Once the rains did set in, however, they favoured good germination, which was general throughout the country, and for a time the cotton grew very well. As the season advanced the rains continued fairly heavy, as in the previous season, and it soon became apparent that the country was experiencing another abnormally wet year. Following as it did on top of a record year of rainfall, it is natural to presume that the sub-soil became saturated, thus preventing the free development of root formation, which in the case of cotton, being a deep-rooted plant, suffered much. The plants were weak and the amount of flowers shed was excessive, with the result that when bolls were formed eventually there were not enough to feed the bollworms and leave sufficient to give even a moderate crop. In addition to the losses arising out of bollworm attacks, the weakened condition of the crop rendered it more susceptible to jassid attacks, which were fairly prevalent throughout the country, although a number of crops appeared to escape. By the beginning of March it looked as if the cotton was about to overcome all the various difficulties it had encountered, and even then hopes were entertained that there would be sufficient cotton reaped to justify the outlay involved in planting, cultivating and tending the crop generally. Unfortunately, heavy rains were again experienced at this time, added to which the prevalence of red cotton stainers was noted in unusually large numbers. They attacked the young bolls to such an extent that when eventually they opened the lint was so badly stained as to be practically worthless. In all probability the stainers were also responsible to a large extent for the failure of the bolls to open properly. Bearing in mind the fact that the crop had been planted late, there was always the chance that the cotton might not have opened well in any case, but there is little doubt that the severity of the stainer attack did much to accentuate the then state of affairs. Considering the vicissitudes through which the crop had passed, it was surprising to find the plants bearing as many bolls as they did. Compared with the previous year, about the same period, there was a distinct improvement in this respect. This improvement, however, was more than offset by the effect of the stainers. Actually the cotton was on the plants, but it was not worth picking, or at least the greater portion of it was not. Only an occasional boll would fluff out properly, the remainder having to be picked lock by lock, thus increasing the cost of picking out of proportion to the value of the crop.

This failure of the crop to open out properly constitutes the outstanding feature of its behaviour and leads one to consider what would have been the result had the crop been planted earlier (which was impossible, on account of late planting rains) or had an earlier maturing variety of cotton been planted. In either case there can be little doubt as to what the result would have been. The crop would have been further advanced and there would not have been the same amount of time for the stainers to do so much damage, added to which it would have ripened in warmer weather before the setting in of the cold nights generally experienced towards the end of May. This is a point which is not being lost sight of, and the efforts of the cotton breeding staff at the Government Cotton Breeding Station, Gatooma, are being directed towards obtaining early maturing strains and varieties. The work at the said station has suffered, with the rest of the country, as a result of the unfavourable season, added to which it must be remembered that the initial operations of stumping and clearing, erection of buildings, etc., were not commenced until late in the previous year. Nevertheless, the results obtained there go to show that it is possible to obtain earlier maturing and heavier yielding cottons, although so far there are no indications of being able to secure a much better quality of cotton. This, however, is merely a matter of time, as all plant breeding work is necessarily slow, and it is hoped that quality as well as earliness and increased yield will be obtained from future selections.

Cotton Breeding Station, Gatooma.—Of the imported varieties of cotton which were tested in variety trials, four yielded heavier than the best Improved Bancroft grown from locally procured seed. Three out of the four matured about ten days earlier and two of the three gave slightly better lint. These two were Delphos and Express. Using Improved Bancroft as a standard of comparison, and giving it a value of 100, the other varieties compare as follows:—

Improved Bancroft	100
Delphos	159.5
Acala	140.5
Trice	151.9
Express	158.2

Two jassid-resistant varieties were grown under observation, namely, Tanguis and Cambodia. They were certainly jassid-resistant, but the yields obtained from them were so poor as to preclude them from further trial.

Drought-resistant strains of the Durange variety were also grown under observation, but these arrived too late to plant with the other varieties, so that comparison is not possible. The superior quality of the lint from this variety was such that the strain is being grown for further observation.

From the foregoing it will be seen that the two varieties Delphos and Express. appear to be a distinct improvement on the cotton which is grown generally throughout the country. They are therefore undergoing further trial, and in addition are being propagated as rapidly as possible by means of wide spacing. Their further trial, however, is not being conducted with the cotton of the country, but with two improved strains of Improved Bancroft from Rustenberg. The latter compared favourably with Delphos and Express at Rustenberg, and in the event of their comparison being equally favourable at Gatooma it should be possible to import bulk quantities from the Union of South Africa at short notice.

Although striking results have not been obtained as yet—and under the circumstances such were hardly to be expected—the earlier maturing and heavier yielding qualities of the two varieties in question show a very distinct advance on anything else obtainable in the country at present.

In addition to numerous strains selected in the course of the year, the following list of new varieties and special strains are available for trial in the 1927-28 season. It is unfortunate that they did not arrive in time for planting during the present season:—

Acala No. 5.
Acala 5RH.
Acala No. 25.
Delphos No. 911.
Delphos No. 6102.
Delphos No. 1374.
Delphos No. 1341.
Delta-Webber.
Dodd's Prolific.
Bank Account.
Cleveland Big Boll.
Lightning Express.
Thames.
Miller.
Cook No. 558.
Over-the-Top.
Kelechi.
Triumph.
Lone Star.
Miller.
Scott.
Pima.

In addition to the foregoing, a further consignment of special cottons are en route.

The Position at Present and Future Outlook.—Considering the meagre results obtained during the past two years from cotton, it is significant that farmers have not abandoned the crop altogether. Acreages, for the time being, have been reduced, but under the circumstances this is all to the good. Farmers of long standing and experience realise that the last two seasons have been abnormal, and that in ordinary years there are prospects of them pulling off a good cotton crop. They realise also that with cotton, as with other crops, markets are subject to fluctuation. They have also discovered for themselves that cotton as a crop fits admirably into their scheme of rotation with maize, the enhanced yields of which, following cotton, have been very noticeable throughout the country. The same remarks apply in a certain measure to tobacco following cotton.

The continued efforts of the Cotton Breeding Station to produce better seed will, in time, have the desired effect. Now that the "boom" in cotton is a thing of the past, there is more likelihood of the industry making slow but certain progress; and when we remember that the country is still young, and that we are merely laying the foundations for the greater expansion which is sure to come, cotton will, no doubt, be an important factor in the formation of a "Whiter Rhodesia."

G. S. CAMERON,
Cotton Specialist,
Empire Cotton Growing Corporation.

Annexure "F."

Report of the Chief Entomologist for the Year 1926.

I. Agricultural Entomology.

1. *Pests Affecting Cotton.*—Research in this connection has been in the hands of Mr. J. I. Roberts. Work to date has necessarily been mainly of a preparatory character.

The 1925-26 season was abnormal in regard to rainfall, and on the whole very unfavourable to the crop. Under such conditions a just estimate of the influence of insect pests has not been possible.

Two outstanding troubles of the season have been *lint staining* and premature *reddening of the foliage.*

Preliminary observations have been made with a view to ascertaining—

(1) whether the prevalent staining of the lint is wholly due to the influence of Cotton Stainers (*Dysdercus* sp.), and

(2) whether premature reddening of the foliage is traceable to Jassid (*Chlorita fascialis*), as has been asserted.

Experiments in this connection have been laid down for the present season.

From stained lint, fungi and bacteria belonging to the following genera have been obtained:—*Bacterium malvacearum* South, *Nematospora* sp., *Phytophthora* sp., *Fusarium* sp. and ? *Alternaria* sp.

Comparative tests at the Agricultural Experiment Station at Salisbury indicated that sweet corn was more attractive to American Bollworm (*Heliothis obsoleta*) than Salisbury White maize. There is much to indicate that the latter affords little protection to cotton when planted at the same time. Unfortunately sweet corn apparently grows very feebly on our red soils, and the production of silk was irregular and weak. It also seems very attractive to the Maize Stalk Borer (*Glottula fusca*), and it is doubtful if it can be used as an effective trap crop for American Bollworm in this country.

Pests of cotton recorded during the year include American Bollworm (*Heliothis obsoleta*), Spiny Bollworm (*Earias* sp.) and Soudan Bollworm (*Diparopsis castanea*). Of these the first-named has been most prevalent in Mashonaland and the heavier rainfall areas. The last-named has been recorded in Matabeleland and the lower rainfall areas only. The Soudan Bollworm has been much more in evidence in Matabeleland than last year, and some heavy infestations have been recorded. Spiny Bollworm has been more destructive in Matabeleland, but has occurred as a somewhat minor pest in Mashonaland.

Cotton Stainers (*Dysdercus* sp.) have been abundant everywhere, and some considerable outbreaks of Jassid have been noted.

Other pests include: Lesser Cotton Stainers (*Oxycarenus* sp.), Leaf-eating Caterpillar (*Anomis fimbriago*), and general feeders such as Cutworms, Caterpillars, Surface Beetles (*Tenebrionidæ*), etc.

Observations have been made in connection with all these pests, and preliminary experiments have been carried out in reference to control of Jassid, Bollworms and Cotton Stainers (*Dysdercus* sp.).

2. *Pests Affecting Tobacco.*—Complaints of tobacco pests have been rather numerous this season, due, no doubt, partly to the late planting season, but also to the extended interest in this crop.

Pests recorded include Surface Beetles (*Gonocephalum simplex*, chiefly), Wireworms (*Trachynotus* sp., Fam. *Tenebrionidæ*), Stem Borer (*Phthorimæa heliopa*), Cutworms, Crickets, Grasshoppers, Root Gallworm (*Heterodera radicicola*).

Advantage was taken of an opportunity of carrying out some experiments in the control of the so-called Wireworms (*Trachynotus*), and experiments with baits on similar lines to those adopted in the temperate zone for control of the true Wireworms (*Elateridæ*) have been started.

What may be a useful side observation was made, namely, that surface beetles of the genus *Zophosis* were attracted and poisoned by a bait consisting of maize meal and arsenic. Previous efforts to poison these insects with sweetened arsenite of soda solution on green stuff as a carrier have failed in the field, although very effective against allied species (*Gonocephalum simplex* and *Emyon tristis*). *Zophosis* beetles are hardly as destructive to tobacco and maize as their allies of the genus *Gonocephalum*, but they tend to contribute their share to the total damage.

Arrangements were also made to experiment with calcium cyanide as a soil fumigant against the Nematode (*Heterodera radicicola*) in seed beds.

3. *Pests of Citrus.*—Investigations in connection with pests of citrus trees have constituted the main activity of the Junior Entomologist, Mr. A. Cuthbertson. Since the arrival of this officer a considerable number of observations have been made on the effect of the control measures adopted in the orchards and some bionomical research has been commenced. The latter includes the life history and habits of Citrus Thrips and various species of *Coccidæ*.

The Yellow Citrus Thrip (unnamed) appears to have developed into an annual pest, although the intensity of its attack may vary from year to year. The Fruit Caterpillar (*Heliothis obsoleta*) has been in evidence during the past two seasons.

Control of the Californian Red Scale (*Chrysomphalus aurantii*) and the Circular Purple Scale (*Aspidiotus ficus*) is carried out by fumigation with hydrocyanic acid gas during the winter. Direct observations have been made bearing on the comparative efficacy of (1) the old pot generating method (using sodium cyanide), (2) liquid cyanide and (3) calcium cyanide dust. The latter, which has considerable advantages, appears likely to supersede other methods, if a really effective machine for dosing is evolved, but the pot method is still in general use.

Measures aimed at control of Thrip and Aphis are now general. The critical period is the time of the spring growth, which carries the crop for the season. This growth supports both Aphis and Thrip. A combined spray of lime sulphur and nicotine is usually applied first; this is followed up by nicotine during the flowering period, and may be followed by the combined spray again after the fruit has set. Observations have been made regarding the effect of this treatment. It is questionable whether it would be justified for Thrip alone. The crop last season, following the heavy outbreak of aphis the previous September, was a very light one. The present season has so far been favourable and has not favoured pests to an unusual extent. There is every prospect of an excellent crop.

4. *Ants.*—By means of a poisoned bait consisting of lard, maize meal and Paris green large numbers of ants of the genus *Pheidole* were destroyed in the outdoor insectary, but the bait was avoided later, and the method proved ineffective in ridding the building of these pests.

5. *Outbreak of Laphygma exempta*, Wlk. —In late January and February an outbreak of the highly sporadic pest sometimes referred to as the "Army Mystery Worm" occurred in various localities, including Shamva, Mazoe, Headlands, Lomagundi, Gatooma, Salisbury, etc. Considerable damage was done to maize on some farms, but the cotton crop was not attacked to an appreciable extent. Locust poison and pumps were issued for the purpose of destroying the pest, and Mr. Chorley assisted with operations at Shamva. No second generation occurred, as far as is known, anywhere in the Colony.

6. *Locusts.*—A swarm of flying locusts was definitely reported in the Victoria and Chilimanzi districts in May, but in spite of diligent enquiries, no further news of the insects could be obtained. No specimens were secured.

Towards the end of the year steps were taken to concentrate all locust pumps at Salisbury and Bulawayo. This process was not concluded by the end of December.

II. Medical and Veterinary Entomology.

Tsetse Fly.

1. Lomagundi. — (1) *Operations.* — The fences which were completed in December, 1925, have been carefully maintained throughout the year, and efforts have been continuous with the object of removing the game. A European ranger, labourers and native hunters have been employed for the purpose. The brush barriers, supplementing the wire fences, have given considerable trouble, although attempts to protect them by fire guards were commenced as early as possible. The barrier along the southern fence has been destroyed almost entirely by fire, and several wide gaps have been made in the barrier along the northern fence. The latter have been refilled. The value of the brush barriers in reference to game control is unquestionable, but they seem to be very difficult to protect from fire, and are expensive both in construction and maintenance.

Reports as to the efficacy of the fences are on the whole favourable. Very few animals indeed have broken through the north fence, but a certain section of the south fence has been broken more than once by herds of eland and sable. The section in reference crosses a big vlei, and the fence is being steadily strengthened by additional posts and wires. Breakages have greatly decreased latterly.

Notwithstanding the general efficacy of the fences, much more game has had to be destroyed in the area than was anticipated in view of the apparently successful game drive in November, 1925, and the bag of the larger species shows little sign of diminution up to the end of the year. The most hopeful aspect lies in the fact that the eastern half of the area, which is the more infested with tsetse fly and adjoins the greatest number of affected farms, has been reported almost clear of big game for several months. Immigration of game from the west across the Angwa River is suspected, but no definite indication of this has been obtained.

Game is without doubt increasing greatly in the temporary sanctuary maintained north of the fenced area, where, during a few days' visit in September, I saw large herds of eland and many other antelope. The contrast between the intensively hunted country between the fences and the undisturbed area on the northern side of the fence was very abrupt and marked. Herds could be seen almost daily across the fence.

Operations against game have been continued in the Sipolilo sub-district under the direction of the Assistant Native Commissioner, Sipolilo. This area is not fenced.

This destruction of wild life is exceedingly regrettable, but apparently unavoidable. If settlement advances, the game will be destroyed or driven out in any case, and there can be no logical objection to driving out the game with a view to maintaining and advancing settlement, which is, of course, overwhelmingly the most important consideration.

(2) *Tsetse Fly Inspection.*—Four European inspectors have been employed in this district with a view to determining, as accurately as possible, the distribution and occur-

rence of tsetse fly. Only three have been employed at any one time. These inspectors have been provided with bait oxen and six natives apiece, and have covered practically all the suspected country outside the definite fly area, including the fenced zone.

It appears unnecessary to give details of the results of this inspection in this report, but it may be said that the discovery of tsetse flies in the indefinitely infested area, in spite of the intensive method employed, has not fully embraced all localities in which trypanosomiasis occurred in cattle last season. Our knowledge of the occurrence of the pest has, however, been considerably extended. It is clearly not feasible by direct observation accurately to define the limits of the country endangered by this pest.

Within the fenced zone the indefinite nature of the infestation, except close to the northern fence, has been very clearly demonstrated. The average catch per European with six natives over a period of twenty-two weeks was approximately one fly per week in the area indicated. Nowhere, except north of the Chunsenga River and close to the north fence, were double figures reached in any one week. On affected farms outside the fenced area only odd flies were taken. On the block of farms between the Msitkwe-Dora and Hunyani Rivers, east of the latter, only one fly was taken altogether in approximately five months.

Trypanosomiasis.—This disease was prevalent last wet season on the farms between the Msitkwe-Dora and Hunyani Rivers, including Chiwe, Silater, Mafoota, Mafoota Extension, Chisanga and Allangrange. On the last-named farm, however, only three fresh cases were reported. Msitkwe River Ranch also suffered, and Nyamaka's cattle near the Mabare River were reported to have been affected, but this has not been substantiated. West of the Hunyani, Mcheringe Farm suffered heavy losses, also Gudubu. The disease was also diagnosed on Robbsdale and Riversdale. Suspicious cases occurred on Mungamwa.

Msitkwe River Ranch and Gudubu have been evacuated, and only towards the end of the year was a decision to suspend farming operations on another farm postponed.

Abortive Grass Fire.—Plans for an organised grass burn on the affected farms east of the Hunyani were frustrated by a premature fire, which swept these farms in July. This fire occurred within a few days of my securing promise of co-operation on the part of the farmers concerned.

Results of Operations.—It is clearly too early to anticipate definite results from the fenced zone, which is intended to relieve the situation on the affected farms. The disease has usually manifested itself in a decisive manner on these farms during the latter part of the wet season. In the Sipolilo area the report for the year suggests that the position in regard to native cattle is somewhat improved, but no definite conclusions can be drawn as yet.

2. Hartley (Gatooma).—The situation in this area has developed very unfavourably during the past year or more, the fly having advanced eastward to the Rhodesian Plantations, Carfax Estate and some neighbouring farms. It is judged that during the past three years the fly has over-run something like twenty miles of country on a twenty-mile front.

The incidence of trypanosomiasis in cattle and the work of two European inspectors have defined the position with reasonable clearness, but here again direct observation of the occurrence of fly has not covered all the country in which cattle have contracted trypanosomiasis.

Intensive inspection has indicated definite eastward advance of fly during the dry season, the insects being met with in some numbers further and further east as the season advanced, whilst the density has continued to increase westward from the eastern limit, as observed at any particular time. Large quantities of game, including warthog, have been reported by many observers in this area.

At the end of the year the western border of the Rhodesian Plantations and the northern part of Carfax Estate were definitely infested, and flies have been taken as far south as Elgeyo Farm. Practically all the cattle on Carfax Estate have died, heavy losses have been sustained on the Rhodesian Plantations, and odd cattle have died from the disease on Milverton, Delamere and Sunnybank. Some oxen working with a road party near the headwaters of the Yabongwe River on the Golden Valley-Turkois road were also infected. A considerable number of oxen belonging to a wood contractor at the Turkois Mine contracted the disease, but this was apparently due to wood cutting activity on the Rhodesian Plantations.

As a preliminary measure a thirty-five mile game fence along the western borders of the Rhodesian Plantations, Carfax, etc., was recommended and authority secured for the necessary expenditure. It was hoped to get this erected during the dry season, but circumstances have delayed the work. At the end of the year Mr. Chorley of this branch was in the area distributing the wire.

Grass Fire.—An attempt was also made in this area to test the practicability and broad effect of an organised late grass fire. Although some measures were taken by the police to check grass burning, these efforts were unsuccessful on the whole. In point of fact it is impossible to stop early grass burning in this district without close patrol of a vast area. In August it was clear that if anything was to be done it must be done at once, as the veld was burning in all directions. A three-day burn on a twenty-mile front was therefore hurriedly organised with the aid of some four hundred natives, supplied by the Rhodesian Plantations and Carfax Estate. The natives were under the direction of nine Europeans.

The burn was not altogether successful, although much better on the first day than on the two succeeding days. This was largely due to lack of acquaintance with the country on the part of the operators. The wind also was not strong enough for the best results. In any case, the inspectors reported taking tsetse flies immediately in the wake of the fire, and the burn generally had no appreciable effect. In point of fact the position subsequently developed for the worse. Although this experiment cannot be regarded as disproving the possibility of adversely influencing the tsetse fly by means of organised grass fires, it illustrates the difficulties attendant upon putting the measure into practice, as also does the experience mentioned in regard to Lomagundi.

3. Darwin.—The Cattle Inspector reported in September that "this year J. Giles and the B.S.A. Police are the only people losing cattle from similar symptoms to those which died in large numbers previously." It is to be noted that in the years 1923 and 1924 operations against game were conducted in this district, but the operations were not continued in 1925 or 1926. An "open area" has, however, been maintained. Losses on one large ranch totalled, according to the Cattle Inspector's report, about 800 head in 1924 and 1925. There still remain about 850 head of cattle on this property, I am informed, but losses from fly disease are stated entirely to have ceased.

4. Sebungwe-Bubi-Wankie.—A special tour of inspection along the Gwaai River was carried out by the Cattle Inspector, Nyamandhlovu, at my request, during the year. His report indicates continued immunity of cattle in reference to trypanosomiasis in this formerly affected area. This immunity has now lasted over five years.

Reports of hunters, however, indicate increase of both game and tsetse fly in the area of the former game elimination experiment, especially on the lower Kana River. Recrudescence of the disease along the Gwaai may, therefore, occur in the near future.

Reports from the Sebungwe district indicate continuation of the spread of fly, which has apparently not ceased since 1897.

5. Transmission of Trypanosomiasis—Experiments.—Three experiments were carried out last wet season in fly-free areas in the Gatooma, Hartley and Sinoia districts respectively, two newly fly-struck cattle being herded with four healthy animals in each case. In the Gatooma area one of the associated animals contracted the disease. The experiments at Hartley and Sinoia gave negative results. Notes on prevalence of blood-sucking flies were made during the progress of the experiments. *Stomoxys* was the most prevalent genus, and these flies were not very abundant. *Culicoides* was much less in evidence than during the preceding season. Only a few *Tabanids* were recorded. Owing to reasons beyond my control these experiments, like all previous efforts in the same direction, were not started until late in February, and the usual heavy outbreak of blind flies (*Hæmatopota*) in January and early February was missed.

I wish to express my appreciation of the spirit of co-operation displayed by the Chief Veterinary Surgeon in connection with these experiments and in regard to the tsetse fly problem generally.

Cattle Myiasis.

A number of flies were bred out from maggots taken from cases of "screw worm" in cattle. All proved to be the species *Chrysomyia bezziana*, Villen. This species was not found amongst flies caught in traps baited with carrion on a badly affected farm.

Nurseries Ordinance, 1909.

Twenty-four nurseries were registered and inspected during the year.

Importation of Plants Regulation Ordinance, 1904.

The following consignments have been dealt with by the Plant Inspectors at the various ports of entry:—

Bulawayo	4,526
Gwelo	241
Salisbury	1,565
Umtali	260
	6,592

One hundred and twenty-four special permits for the introduction of plants, etc., into the Colony were issued during the year.

Annual permits for nurseries in the South African Union totalled 59.

Two consignments of coffee seed from Uganda were found to be infested with the Coffee Berry Borer (*Stephanoderes hampei*) and were destroyed.

Regulations in other Countries affecting Export of Plants from Southern Rhodesia.

Permits have been issued for the export of 898 bales of cotton to the South African Union under the agreement with that Government.

Certificates of freedom from pests have been issued in compliance with plant import regulations enforced by some other States.

Rhodesia Agricultural Journal.

It is regrettable that so little time has been available for the preparation of articles for the *Rhodesia Agricultural Journal*. An article entitled "Tsetse Fly in the Lomagundi District" appeared in two parts in the February and March numbers.

Notes on the Army Worm and Cattle Myiasis were contributed to the May number.

Agricultural Shows.

The entomological exhibit was placed on the benches at the Agricultural Shows at Bulawayo, Gatooma, Umtali and Salisbury.

The exhibit was completely overhauled by Messrs. Roberts and Cuthbertson for the Salisbury Show.

Officers of the branch attended the various agricultural shows held in the Colony during the year.

Farms visited—173.

LECTURES TO FARMERS.

Mr. Chorley: Concession, 12th October, *re* Maize Weevil; Tobacco Experiment Station, 10th November, *re* insects in general, special reference to tobacco.

Self: Hartley, 23rd July, *re* Pests of Tobacco, Cotton and Maize; Gatooma, 21st August, *re* Tsetse Fly position.

STAFF.

During the year the staff of this branch has been increased by two technical officers. Mr. J. I. Roberts reported for duty on 25th January, and Mr. A. Cuthbertson on 21st June.

Mr. J. K. Chorley was absent on long leave from 5th April to 5th October.

Mr. Roberts was granted occasional leave from 20th to 29th December.

RUPERT W. JACK,
Chief Entomologist.

Annexure "G."

Report of the Irrigation Engineer for the Year 1926.

Staff Changes.—Owing to Departmental changes and absence on leave, the staff was not at full strength throughout the year.

Mr. A. C. Jennings, Irrigation Engineer, was seconded to the Lands Department at the end of January.

Mr. P. H. Haviland acted as Irrigation Engineer until he went on two months' leave at the end of July, from which date I have acted in that capacity.

Mr. N. P. Sellick was seconded to the Hydrographic Branch at the beginning of April, when I went on three months' leave, and has remained there since.

Mr. R. H. Roberts joined the staff as Assistant Irrigation Engineer on the 1st May.

The boring superintendent transferred his headquarters from Bulawayo to Salisbury at the end of July.

Engineering Advice to Farmers and Others.—Owing to being short of one engineer during the year it has been difficult to keep pace with the demand made by farmers and others for engineering advice and assistance.

Requests for advice on the prevention of soil erosion have in particular shown a marked increase during last year, and it is apparent that the succession of wet years recently experienced have made farmers realise the necessity for undertaking measures to prevent erosion. The services of one engineer could be fully occupied with work of this nature during the dry season.

Advice is sought and given on a great variety of subjects, amongst which may be mentioned:—

Surveys and reports on irrigation and water power schemes, soil erosion, construction of tobacco barns and general farm buildings, dipping tanks, well sinking, water supplies, etc.

The following is a summary of the visits paid to farmers and others, together with the total areas of new land reported upon as capable of being irrigated:—

No. of farms, etc., visited	112
Acreage of new irrigable land investigated	5,209
Total acreage of irrigable land reported on to end of 1925	38,682
Total acreage reported on to end of 1926	43,891

Included in the total of 112 visits to farms are 41 visits in connection with soil erosion problems, all of which were in Mashonaland.

In addition to the above, 10 farmers' association meetings were attended during the year and addresses delivered on soil erosion and small irrigation schemes; three of these farmers' associations were situated in Matabeleland.

Two lectures on soil erosion were also delivered to the apprentices at the Tobacco Experiment Station, Salisbury.

Numerous enquiries have been received from new settlers for plans of cheap dwellings and ordinary farm buildings. The demand for information regarding tobacco barns has also been very considerable during the year.

The construction of the Agricultural Department pavilions at Salisbury and Bulawayo was supervised by this branch.

Irrigation.—The great bulk of irrigation schemes considered this year have been for small areas varying from five to fifty acres in extent. This is regarded as a favourable sign, as it is by the full development of small individual irrigation schemes that the value of irrigation as an adjunct to sound mixed farming will be proved.

Most of these small schemes advised on have actually been put into operation.

The large acreage shown this year is due to the fact that two large schemes were reported on, viz.:—

1. At the request of the British South Africa Company a preliminary reconnaissance of the irrigation possibilities on Nuanetsi Ranch was carried out by Mr. Sellick during July. An area of 3,500 acres of suitable soil was considered to be irrigable by means of storage dams.
2. An area of 1,000 acres in the Sabi-Tanganda Valley was reported on by Mr. Haviland in May. In this case the scheme has been put into operation and an area of about 100 acres is under irrigation at present, which will be extended later as development proceeds.

Both of these schemes are situated in the low veld, where the summer rainfall is erratic or light in the majority of seasons. There is no question that considerable development could take place in these areas if suitable irrigation facilities were provided. Both areas contain considerable extents of fertile soil lying on even regular slopes, and are traversed by large rivers which drain from high country on which the normal rainfall is heavy.

Flood diversion schemes without any considerable storage would permit of the cultivation of summer crops such as cotton and tobacco in this area, which is not normally possible under the existing rainfall conditions.

The question of irrigation to permit of the early planting of cotton and tobacco on the high veld is also receiving increasing attention from farmers, and a certain number of applications for schemes of this nature have been considered. A certain amount of supervision has been effected over the Matopo irrigation works. The banks of the Malemi storm canal have been repaired, the spillway near the dam lowered and widened, an additional spillway 50 feet in length constructed and a headgate and outlet culvert installed. This will enable full control to be exercised over flood water entering the dam.

A contour survey of the irrigable lands under the dam was also completed during the year.

Water Supplies.—A number of water supply schemes for Government institutions and out-stations were investigated and reported on for the Public Works Department.

Estimates were prepared and the construction supervised of such schemes as reached that stage.

Works have been carried out and supervised at Matopo School, Domboshawa, Salisbury Police Camp, Concession, Mtoko, Darwin, Mrewa, Prince Edward School, Salisbury, Plumtree Native Commissioner's Camp and Norton Police Camp, involving an expenditure of £4,600.

Reports and estimates were also prepared for water supply installations at Bikita, Zaka, Rusape, Salisbury Hospital and Beatrice Police Camp. A water supply scheme for Umvuma township was also investigated during the year. The scheme is at present in course of construction at a cost of £850.

Water Supply Development in Native Reserves.—Two drills have been continuously engaged on boring for water in the Mphoengs, Gwaai and Gwelo Reserves, and windmills and tanks were erected at numerous places. The object of this work is to open up new areas for native settlement, and is fully dealt with in the appendix to the annual report of the Chief Native Commissioner.

Boring on Crown Lands, Farms, etc.—Three additional drills of the combined percussion-rotary type were brought into operation during the year, making four in all engaged in general drilling, apart from the Native Reserves.

Summary of footage drilled, cost per foot and aggregate yield per 24 hours:—

Total depth drilled	3,773 feet
Footage drilled per working month	123.7 feet
Average charge, including casing (all boreholes)	21/6 per foot
Average charge, including casing (private applicants) ...	19/6 per foot
Aggregate yield of successful boreholes	417,780 gals. per 24 hours

Successful supplies of over 2,000 gallons per day were developed in 65 per cent. of the boreholes sunk. Dead footage in boreholes which were abandoned owing to no supplies being obtained amounted to 1,107 feet, i.e., 34 per cent. of the total depth drilled.

These costs are very low considering the nature of the formations drilled in, and could only have been achieved by using the combined percussion and shot method of drilling.

Nos. 5 and 6 drills were constructed by an engineering firm in Johannesburg in accordance with a design submitted by the boring superintendent for a new type of percussion drill mounted in a steel frame, the necessary drawings and specifications being prepared in this branch. This type of machine is very much superior to No. 4 drill, which was imported from America, and the cost is considerably cheaper.

The boreholes in the Golden Valley and Trelawney areas were sunk on recently occupied Crown land farms where no permanent water exists. The following table shows the total revenue and expenditure on Nos. 3 and 4 drills to date. Nos. 5 and 6 have been running for too short a time to render this analysis fair.

No. 3 Drill.—

Total expenditure (1.4.25 to 31.12.26)	£2,736 2 3
Total revenue earned (same period)	2,324 11 11
Loss on running for 21 months	£411 10 4

This loss includes a book entry of £306 6s. 7d., representing depreciation on tools and plant, the actual cash lost being, therefore, £105 3s. 9d. only.

No. 4 Drill.—

Total expenditure (1.12.25 to 31.12.26)	£1,678 14 0
Total revenue earned (same period)	1,871 5 3
Credit balance (12 months)	£192 11 3

This balance of revenue should serve to cover the depreciation on plant and tools.

Staff.—The above figures reflect great credit on the boring superintendent and the drill personnel as to the efficient manner in which the boring work is conducted.

Acknowledgment is also made of the loyal services rendered by the staff of the Irrigation Branch during the year.

C. L. ROBERTSON,
Irrigation Engineer.

Annexure "H."

Report of the Hydrographic Engineer for the Year 1926.

Staff.—During my absence on three months' leave from April to June Mr. Sellick acted as Hydrographic Engineer, and has remained in the branch since owing to the temporary amalgamation of the two branches.

Meteorological.—The routine work of this section consists of the collection and classification of data obtained from local observers relating to the climate and rainfall conditions in the Colony. The change in the number of reporting stations during the year was as under:—

	Number on 31st December, 1925.	Number on 31st December, 1926.
Stations with automatic instruments	3	3
Barometric stations	8	8
Thermometric stations ...	35	36
Rainfall stations	450	463
	496	510

The data obtained are checked and tabulated in a convenient form for general information and for scientific purposes.

The data are also studied and correlated with similar data from other countries with a view to improvement in the short and long period forecasts.

The information published during the year consisted of the following:—

(1) The annual meteorological report for 1924-25 was presented to the Legislative Assembly in May. The report for 1925-26 is now available for the printers.

(2) A monthly report in the *Agricultural Journal* containing summarised information regarding the chief climatic features of the previous month and the monthly rainfall recorded at half the reporting stations. This is issued as a separate bulletin and sent to various meteorological organisations in the world.

(3) A weekly summary of rainfall recorded at 50 daily reporting stations and a comparison with the normal was communicated to the Press and sent to various Government officials.

(4) A daily weather report and forecast are issued at noon daily during the rainy season and telegraphed to 35 centres for distribution amongst the surrounding farmers, and were also communicated to the Press for public information.

Special weather messages were requested and furnished during the progress of Sir Alan Cobham's flight.

(5) Daily records from five of our barometric stations are sent monthly to the British Meteorological Office at Kew for inclusion in a journal containing meteorological data for the British Empire.

(6) The departure of our mean seasonal rainfall from normal and a summary of the main features are sent to the Indian Meteorological Department in April. This information is utilised in the forecast of the Indian monsoon rainfall.

(7) A bulletin entitled "Weather Maps and the Short Period Forecast in Rhodesia" was published during the year.

Seasonal Forecast.—No further investigations regarding an improvement in the seasonal forecast were possible during the year owing to staff changes, etc., as a considerable amount of labour is involved in such investigations.

The rainfall actually experienced was considerably in excess of the forecast owing to heavy rains in the latter end of February and March, but it may be claimed that the forecast fairly typified conditions throughout the bulk of the season.

A forecast has also been prepared of this season's rainfall, which up to date has also generally typified the rainfall conditions experienced.

Hydrographic.—The routine work of this section comprises the collection of data relating to the storm and winter flow conditions of the chief rivers in the Colony, and a study of these data in conjunction with the rainfall and physical conditions of the catchments with a view to supplying reliable information regarding the potentialities of the different river systems for irrigation and power purposes.

The information is obtained by means of:

(a) first-class gauging weirs equipped with automatic recording instruments at dams or gauging weirs;

(b) second-class gauging stations, at which daily records are taken of the river level by local observers;

(c) individual gaugings by members of the engineering staff when on tour.

There are eight first-class gauging stations in existence, an increase of two since the previous year.

The abnormal floods experienced during last year enabled a large amount of valuable information to be obtained regarding the maximum flood discharges in our main rivers, as in many cases these were in excess of those recorded in the previous season of abnormal rainfall.

During the year the Rhodesia Base Metals Syndicate obtained data from this office for use in connection with their investigation for a hydro-electric scheme near the Copper Queen Mine.

Water Right Applications and Reports.—During the year 30 applications for the use of water were reported on for the Water Court. The reports submitted dealt with such matters as the river system affected, water available for apportionment and effect of proposed application on existing grants.

Grants were issued for the irrigation of a total of 1,442 acres.

C. L. ROBERTSON,
Hydrographic Engineer.

Annexure "I."

Report of the Chief Chemist for the Year 1926.

General.—The science of agriculture covers a very large field and in its study embraces many of the modern sciences. It can be understood, therefore, that the science of chemistry in its application to agriculture must necessarily overlap the boundaries, which are to a large extent arbitrary, of the cognate sciences, and that the activities of the chemical branch of the Department of Agriculture must be of a very varied character. The main work carried out by this branch has naturally consisted, on the one hand, of research and investigation into problems affecting the farming industry, and on the other hand of the ordinary routine work, under which head are included the following:

1. Analyses of samples taken under the Ordinance governing the sale of fertilisers and farm foods.
2. Cattle dip and toxicological analyses for the Veterinary Department.
3. Analyses of samples of water for the Medical Department.
4. Forensic analyses for the Criminal Investigation Department. (The work under this heading requires very special care and attention.)
5. The analyses of soils sent in by farmers and the rendering of immediate assistance to farmers in problems and difficulties occurring in their every-day work.

The record of work for the period under review shows that the number of samples of soil received for analysis and report is in excess of any previous year, and owing to the abnormal staff conditions prevailing in this Department from August until December, during which period of the year the greater number of soils are always received for analysis, it was found necessary to refer back for future examination a number of soils which required more than the customary analysis to afford the information desired.

Work on these soils is at present proceeding.

Soils.—Apart from the general advisory work upon soils, there have been submitted to the branch for examination and report one hundred and ninety-one samples of soil and twenty-three samples of sub-soil. In the majority of cases information was desired as to the suitability of the soil for the production of tobacco and for advice as to the most suitable manurial treatment. None of these "routine" samples presented abnormal features of sufficient importance to call for special reference.

(1) Soil Investigations.—The experiments in soil treatment and manuring for maize production, which were laid down by the branch on the plots at the Salisbury Experiment Station in 1919, are still in progress. A report upon these experiments extending over four years was published by Mr. Blackshaw in the *Rhodesia Agricultural Journal* in 1923, and the results from these plots up to the season ended 1925 were summarised in a further article which appeared in the Journal in December, 1925.

(2) Citrus Fertiliser Trials, which were laid down in 1923 and are being carried out in conjunction with the British South Africa Company on their citrus estates at Mazoe, Sinoia and Umtali, are still proceeding.

(3) Cotton Fertiliser Trials.—Through the courtesy of the manager of the Mazoe Citrus Estate about ten acres of land were placed at our disposal on the Mazoe Citrus Estate for cotton manurial trials. A scheme was drawn up in consultation with the cotton specialist and it was decided to test the effect of five different dressings of fertilisers. The experiment was commenced on the 19th December, 1926.

(4) An experiment was commenced on the extension plots at the Salisbury Experiment Station in December, 1926, the object being to determine the relative influence on maize crops of—

(a) the standard "bone and superphosphate" mixture;

(b) rock phosphate.

The plots used in this experiment have previously been planted to maize for three years.

(5) At the beginning of March, 1925, an attempt was made to carry out an investigation into the mineral content of Rhodesian grasses and grain products.

This enquiry was undertaken in view of the reported "phosphate" deficiency in the common farm crops grown in South Africa and the reported benefit derived from feeding bone meal to stock to correct this deficiency. It is unfortunate that, owing to pressure of other work, very little progress has been made into this important field of research, particularly as the importance of the mineral elements in the nutrition of farm animals is becoming more and more universally recognised. That this problem is of vital importance to stock owners in Southern Rhodesia cannot be doubted, as it is a well known fact that the main deficiency in the soils of this country is phosphates, and that the vegetation to some extent reflects in its mineral composition the character of the soil on which it is grown. Many cases of malnutrition in animals due to mineral deficiency

of pastures have been recorded in South Africa and different parts of the British Empire. In certain parts of Australia the vegetation is poor in phosphorus and the characteristic bone lesions and paralysis associated with deficiency of this mineral are common. Accounts are recorded in the literature of the live stock industry of the impossibility of keeping cattle in good condition in certain of these areas after the land was fenced and the areas on which the animals could graze restricted. When, however, the soil was fertilised with the deficient minerals, the live stock could be maintained in good condition.

In view of these facts it would seem advisable that this investigation be proceeded with as soon as the present pressure of work is relieved.

Manures and Fertilisers.—Twenty-five samples were analysed under this head during the year, of which ten were samples taken under the Fertilisers, Farm Foods, Seeds and Pest Remedies Ordinance.

Vegetable Products.—During the year reports were issued upon seven samples submitted under this head.

Three of the samples were of dried orange products, submitted by the manager of the British South Africa Company's Citrus Estate, Mazoe. Advice based on the results of analysis of the samples was given regarding the testing of the food value of the products for cattle and pigs.

Two samples of cotton seed cake manufactured by the Central Cotton Ginneries, Ltd., submitted by the Dairy Expert, were found to contain considerably more protein and less crude fibre than American cold pressed cotton seed cake.

Dairy Products.—Only four samples of dairy products—viz., milk—were received for examination during the year. Three of the samples were submitted by the Municipal Sanitary Inspector from three local dairies, and the report was forwarded to the Medical Director, Salisbury.

One sample was submitted by Mr. A. V. Williams, Lorelei, Salisbury, who suspected that the milk had been tampered with.

Rocks, Limes and Minerals.—Eleven samples were submitted under this head, and consisted chiefly of travertine limes. Advice was usually requested as to their suitability for building purposes or for the liming of soils.

Cattle Dips.—Fourteen samples were reported upon during the year.

Toxicological Analyses.—Of the eighty-one toxicological analyses carried out, forty were performed upon samples of viscera obtained from cases of suspected poisoning. In 46 per cent. of these cases sufficient arsenic was found to state that death was most probably due to arsenical poisoning.

Forensic Analyses.—Seventeen analyses were carried out under this head for the Criminal Investigation Department.

Water Analyses.—Twenty-three samples of water were submitted for analysis during the year. In the majority of cases a report was desired as to the suitability of the sample for drinking purposes.

Miscellaneous Samples.—Included under this head are samples of disinfecting fluids, supposed fertiliser, cotton seed oil, sulphuric acid, Esanofele pills, Glauber's salt, boys' meal, alcohol, water sterilising tablets and human milk.

The sample of "supposed fertiliser" was found to be carbonate of soda, which had been supplied in a consignment of superphosphate.

Summary of Routine Analyses.—A list of the routine samples received and analysed during the year is presented in the following table:—

Soils	191
Sub-soils	23
Manures and fertilisers	25
Cattle dipping fluids	14
Toxicological analyses	81
Forensic analyses	17
Vegetable products	7
Waters	23
Rocks and minerals	11
Dairy products	4
Miscellaneous	20
	416

Publications.—During the year the following articles were issued from the chemical branch for publication in the *Rhodesia Agricultural Journal*:—

"Suspected Poisoning of Stock."
"Rhodesian Soils and their Treatment."
"The Purchase and Valuation of Fertilisers."
"A Note regarding Soils for Bright Virginia Tobacco."
"A Note regarding Rock Phosphate."

Travelling.—An officer from this branch attended nine farmers' association meetings and gave an address upon subjects pertaining to the management of land and the feeding of farm stock.

Owing to the shortage of staff during the greater part of the year the number of farms visited by the officers of the chemical division has been less than in previous years.

Members of the staff were in attendance at the Agricultural Show held in Salisbury, at which, in addition to the usual exhibits of the chemical division of types of Rhodesian soils, fertilisers and agricultural products, a special exhibit was made of simple tests for soil reaction and of arsenic tubes demonstrating how arsenic is detected.

Staff.—Two members of the staff have retired during the year. Mr. Blackshaw,

O.B.E., B.Sc., F.I.C., was absent on vacation leave from 1st March to 31st August and then retired. Mr. E. V. Flack retired on the 31st July. Miss J. M. Anton, B.Sc., was appointed a temporary assistant and joined the staff on the 14th July.

Mr. R. McChlery, B.A., B.Sc., was appointed to the staff as Junior Agricultural Chemist on the 3rd August, and after a preliminary course of three months at the Rothamsted Experiment Station, commenced his duties in the Department on the 2nd December.

Mr. A. D. Husband, A.I.C., was appointed Chief Chemist on the 1st October and took up his appointment on the 31st December.

ALFRED D. HUSBAND,
Chief Chemist.

Annexure "J."

Report of the Forest Officer for the Year 1926.

I have the honour to submit the annual report of the Forestry Branch for the year ended 31st December, 1926.

The period has, in my opinion, been one of achievement; the chief points, reviewing results as a whole, which are of significant note, are the effect of fire protection in the Kalahari sand forests, as well as valuable data collected in the course of carrying out the work; the increase of the business of sale of produce from the Forest Nursery at Salisbury; the speeding up of afforestation work on the Government Forest Reserve, Mtao; and the considerable amount of time which has been given to itinerant work, to farmers' associations, farmers, and other bodies throughout the Colony.

In regard to the work of the European labourers at Mtao, the forester in charge states that operating the work purely as a relief scheme, with fixed rates of pay, is not giving maximum efficiency. He bases his statement on comparison with previous working, when it was possible to give out piecework and when overtime was permitted. The behaviour at the camp has been good. The strength on 1st January, 1926, was 24 labourers. During the year 56 were admitted and 46 departed. The strength on 31st December, 1926, was, therefore, 34. The health of the camp has been good on the whole. Five men were placed on Government employment, two with the Entomological Branch, one with the Cotton Breeding Station, Gatooma, and two with the Forestry Branch.

It is now necessary to report in detail, under the heads which follow, on the work performed at headquarters and at the field stations, which are the Kalahari Sand Forests, the Forest Nursery, Salisbury, the Mtao Forest Reserve and the European Labour Scheme, Mtao.

I. Extent and Constitution of State Forests.

The Forest Service acts in an advisory capacity for the indigenous forests situated in the Kalahari sand areas in the Wankie and Nyamandhlovu districts. Areas are being exploited under agreements by Messrs. Fox and Bookless, the Zambesi Sawmills, Ltd., and the Rhodesia Native Timber Concessions. It is understood that the Land Commission has recommended that an area of 670,000 acres be set aside for establishment as a forest reserve.

At Salisbury the Government forest area (Forest Nursery) has not been extended.

At Mtao the area has been extended by the addition of the farm Eland to the forest reserve; this has been added to the forest reserve as block "K." The area concerned is 2,361.43 acres. The total area of forest reserves is therefore:—

	1925. Total. Acres.	1926. Additions. Acres.	1926. Total. Acres.
Mtao	13,136.94	2,361.43	15,498.37
Salisbury ...	100.00	—	100.00
Total ...	13,236.94	2,361.43	15,598.37

All beacons on the Mtao Forest Reserve have now been located, including those of Eland (block "K"). A distance of 3 miles 1,285 yards has been fenced on the northern boundary of the reserve, and the fencing of 3 miles 1,158 yards on the eastern boundary is being proceeded with.

II. Management of State Forests.

1. Regulation.—(a) *Working Plans.*—The Kalahari sand areas have been divided into four working sections, namely, Masue (Fox and Bookless), Fuller-Kesi (Zambesi Sawmills), Umgusa and Malindi-Intundhla (Rhodesia Native Timber Concessions). For the majority of the above, surveys have been made and maps prepared by the Assistant Forest Officer in charge. Existing roads have been used for boundaries of blocks and compartments as far as possible, and where necessary fresh boundaries have been marked on the ground. The stocking of the forest has been divided into approximate "quality classes."

At Mtao, all block boundaries have been clearly defined, and compartment posts erected in blocks "A" and "C," where compartments have been surveyed.

(b) *Annual Plans of Operations.*—These are prescribed for all field stations.

In the Kalahari sand forests deviations have been necessary owing to the facts that previous records of working did not exist, labour was short, and that the Assistant Forest Officer was the only trained European available to carry out work over a very large area.

At the Forest Nursery, Salisbury, Mtao Forest Reserve and the European Labour Scheme the annual plans have been followed as closely as possible.

2. Protection.—(a) *General.*—Kalahari Sand Forests.—Fire wardens have been engaged in protection against cutting, extraction of honey and various damage. The Mtao Forest Reserve has been systematically patrolled by the manager and native watchers.

(b) *From Fire.*—The Forest Nursery, Mtao Forest Reserve and European Labour Scheme have been adequately protected against fire throughout the year, during which no fires occurred.

Fire protection in the Kalahari sand forests is obviously one of the chief duties to be performed there, and a fuller statement must be made under this head. The Assistant

Forest Officer throughout the year has been employed in organising and putting into effect protection to guard as large an area as possible. He has submitted valuable observations on the nature and incidence of fire in the forest. From his observations the occurrence and intensity of fires are governed by (a) the lateness of preceding rains, (b) the extent to which the species contained are deciduous or otherwise, (c) the density of stocking. Thus late rains, trees which are semi-deciduous or shed their leaves late and a dense stocking with good canopy would delay the incidence of fire and lessen its intensity; and the opposite set of conditions would produce the opposite effect. In point of fact the conditions vary between two such extremes. To any set of conditions must be added the effect of the sudden and high winds which arise and their varying directions, which make fire fighting both arduous and dangerous.

Fire lines are burned between parallel traces, which are 4 to 5 feet wide. It is proposed for future working to make these fire traces with a drag, or sledge, bearing sharpened angle irons to cut the undergrowth.

Unceasing patrol is also necessary to prevent fires springing up within the protected areas.

During the year protection was carried out as follows:—

Area protected.			Cost per	Cost
Sq. miles.	Acres.	Total cost.	sq. mile.	per acre.
453.73	290,387	£550 12 1	£1 4 3	0.45d.

The above refers to work in the Fuller-Kesi, Masue and Umgusa working sections.

In the above sections forest fires occurred to the extent of 20 square miles, which represents 4.4 per cent. only of the entire protected area. The damage done to the growing stock was on the whole slight.

Fires occurred in unprotected areas as in previous years. In this connection the Assistant Forest Officer complains particularly of the many and serious fires caused by big game hunters, particularly those attempting to capture live animals. Other causes are railway locomotives with an insufficient fire guard, wandering natives, and to some extent possibly lightning.

The main fact emerging from this section of the report is, however, the low cost per acre at which valuable hardwood forests can be efficiently protected; and the great potential value increment which may be expected from such a small outlay.

(c) *From Cattle, etc.*—In the Kalahari sand forests it is reported that slight damage is done to inferior species. Damage is caused by cattle and game browsing, the latter including elephant and giraffe. Elephant is reported to damage by breaking branches of Mukwa (*Pterocarpus erinaceus*).

At the Forest Nursery, Salisbury, protection is afforded by fencing, which was maintained in effective order.

At the Mtao Forest Reserve the chief source of damage was spring hares, which ate the leading shoots of young trees. On the European Labour Scheme area similar damage was caused. Steps taken were to erect brushwood fences, with wire snares placed at intervals, round the affected compartments. Results have been satisfactory. All internal fences and gates were maintained in order.

(d) *From Natural Causes.* — Kalahari Sand Forests.—Numerous specimens observed to be "stagheaded" of teak (*Baikiæa plurijuga*) and Rhodesian mahogany (*Copaifera coleosperma*) may be attributed to the result of drought, with fire as a contributory cause. It is, however, to the regeneration by seed of both the above species that drought is more harmful, and in this respect the mahogany suffers more than the teak.

Frosts in July and August also cause damage, but chiefly in the neighbourhood of vleis. Primary damage by wind and lightning is slight, but both have their effect on damage by fire.

Insect damage is chiefly confined to dead and unhealthy trees, but larvæ of *Saturniidæ* from October to December defoliate *Gleditschia africana*, and attack other species to a certain extent.

At Mtao drought and wind have caused a small amount of damage to leading shoots of some species, but these have recovered. There has been no frost damage.

At the Forest Nursery, Salisbury, the following species, namely, *Cryptomeria japonica, Pinus patula* and *Cupressus lusitanica*, suffered from extremes of heavy rainfall and hot dry weather.

3. Sylviculture.—(a) *Natural Reproduction.*—(i.) Indigenous Forests.—During the year on the Kalahari sand many species seeded abundantly. Of these, seedlings were produced which survived the winter of *Baikiæa plurijuga* (teak), *Copaifera coleosperma* (Rhodesian mahogany), *Combretum*, *Ochna* and *Strychnos*. The effect of the previous annual fires in damaging such re-growth has been very great in the past, and observations made during the period under review indicate the very great value of the protective measures now undertaken.

On the Mtao Forest Reserve good germination of indigenous species has taken place; once again the value of fire protection is demonstrated. Here it has been carried out now for over four years, and the improvement both to the surface soil by the accumulated organic matter and also to the growing stock of indigenous trees is very marked indeed.

(ii.) Forests of Exotic Trees.—Natural reproduction of *Callitris calcarata* at the Forest Nursery is the best; to a lesser extent, *Cedrela toona, Melia azederach* and *Jacaranda*.

It should be noted that in most parts of Southern Rhodesia a number of introduced trees offer natural regeneration, but in most

parts of the Colony such regeneration is uncertain and very liable to fail owing to the unsuitable state of the seed bed (*i.e.*, the forest base) and the marked change from rainfall to drought.

(b) *Artificial Reproduction.*—(i.) Indigenous Species.—Kalahari Sand Forests.—Experimental sowings have been made of *Baikiæa, Copaifera, Afzelia, Pterocarpus* and *Kirkia*. The preparation of the patch of ground for the experiment was simple and inexpensive. Seeds were sown in lines 8 feet apart and lightly covered. Good rains followed the sowing, and watering was, therefore, not needed.

After nearly a month (in December) the following were the germination results: *Baikiæa* 100 per cent., *Afzelia* 80 per cent., *Copaifera* 70 per cent., *Pterocarpus* 8 per cent., *Kirkia* nil.

Similar experiments are being made at Mtao. Here the seedlings will be set out in plantation form. In the opinion of the writer this experiment, the first of its kind, will prove of considerable value.

(ii.) Plantations.—Kalahari Sand Forests.—Experiments with exotic trees at Fuller Siding indicate that *E. rostrata* and *E. tereticornis* can be established. The growth at present (since 1924) tends to be branchy.

The total area of plantations to date at Mtao Forest Reserve, excluding the European labour area, is 300.5 acres; 215.5 acres had been planted up to 31st December, 1925, and during the current year the area was 85 acres. Species employed were *Pinus insignis, P. canariensis, P. pinaster, Callitris calcarata* and *C. robusta, Cupressus arizonica* and *C. lusitanica, Fraximus americana, Grevillea robusta, Cedrela toona, Jacaranda, E. botryoides* and *E. paniculata*. During the present season it is proposed to afforest some 143 acres.

All the foregoing are in block "A," adjoining Fairfield Siding.

In the European labour area, plantations of 59.5 acres were established. The species employed were *P. insignis, P. halepensis, C. lusitanica, C. arizonica, C. torulosa, Cryptomeria japonica, Populus alba, Cedrela toona, E. resinifera* and *E. botryoides*.

(iii.) Nurseries and Sale of Seed and Transplants.—There are three nurseries, viz., at Salisbury, at Fairfield Siding (Mtao), and at Block "C," European labour, Mtao.

The chief work of the Salisbury Station is that of providing for the needs of the tree planting public by the raising of transplants and collection of seed. During the year no fewer than 1,124 orders were executed. A very large stock of transplants and seed was maintained, and the sales during the year have exceeded by a large margin any previously recorded results. This is in no way an inflation, but reflects the growing interest which all classes are taking in forestry matters. Had the season been a more favourable one, the revenue would have been still greater. The water supply has been improved by the addition of another cement storage tank.

During the year 410,037 transplants and 292 lbs. 14 ozs. of seed were disposed of.

Nursery stock on hand at 31st December, 1926, was 254,520 transplants, value £1,323 10s. 4d., and 100 lbs. seed, value £75; total £1,398 10s. 4d.

At the Fairfield Nursery improved methods of soil preparation have been evolved; seeds sown in tins are found to be giving better results than those sown in open beds. The nursery was primarily established for raising plants for afforestation on the Mtao Forest Reserve. Plants are, however, available for sale to the general public, and a price list is issued. As the nursery becomes better known it is anticipated that considerable demands from the Midlands will be met. During the year 89,809 plants were disposed of (which include issues to the European labour area), and 169,065 were used for plantation work in block "A." Stock on hand at the end of the year was 410,000 plants, value £1,107. The cost of the labour for raising plants is 8s. 11d. per 1,000.

In the European labour area, block "C," a nursery was established and completely equipped for an output capacity of 500,000 trees per annum. European labour has proved to be more efficient than native for this type of work, although it is also more expensive. The labour cost of raising plants is £1 5s. 2d. per 1,000. At this nursery trees are raised for Government afforestation purposes only. Number used during the year, 26,000; stock on hand at the end of the year, 372,000, value £1,004 8s.

(c) *Improvement of Growing Stock, Indigenous Forests.*—In the Kalahari sand forests operations are carried out for the improved growth and stocking of the forest with the more valuable trees. Undesirable species are thinned out where necessary, and the species favoured are *Baikiæa plurijuga, Pterocarpus erinaceus, Copaifera coleosperma, Afzelia cuanzensis* and *Ricinodendron rautanenii*. Eight hundred acres so treated in the Fuller-Kesi working section cost £30 12s., or 9.2d. only per acre; 2,250 acres in the Umgusa working section cost £22 14s. 10d., or 2.4d. only per acre.

It is hardly necessary to point out that such operations as these, concurrent with the all-important exclusion of fire, will have a far-reaching effect on the improved character and increased value of the forests in the future.

On the Mtao Forest Reserve improvement of the growing stock has been confined to the exclusion of fire, as already reported.

4. Exploitation.—In the Kalahari sand forests, exploitation is in the hands of the Lands Department by the granting of concessions to three companies previously referred to, namely, Messrs. Fox and Bookless, the Zambesi Sawmills, Ltd., and the Rhodesia

Native Timber Concessions. The Forest Service acts in an advisory capacity, and the Assistant Forest Officer, Matabeleland, directs as far as possible the operations of the concessionaires in terms of their timber cutting leases. He is at present, however, the only European concerned with the forest administration of the whole area, consequently much time is occupied in travelling from one working section to another, during which supervision of work has to be left to head "boys" of the native gangs.

At the Mtao Forest Reserve exploitation is confined to the sale of suitable timber resulting from clearing operations preparatory for afforestation. At present timber is chiefly disposed of for firewood and fencing poles. As a result of the closing of the Falcon Mine, Umvuma, revenue from the sale of indigenous timber decreased very appreciably; enquiries have, however, been received from the Felixburg Mines for pit-props, and it is anticipated that a trade in this connection may be built up during 1927.

5. Roads and Buildings.—(a) *Roads.*—In the Masue working section of the Kalahari sand forests, approximately 30 miles of roads 6 feet wide and over were constructed at a cost of £87, or £2 17s. 6d. per mile. These roads are to serve as permanent block boundaries for inspection and patrol, and as guide lines for the burning of fire belts.

The total length of roads constructed at Mtao Forest Reserve was 5 miles, costing £26 6s. 2d.

Roads at the Forest Nursery were kept in repair.

(b) *Buildings.*—Kalahari Sand Forests.—These have been of a temporary nature only, for inspection and survey work. They include huts for the Assistant Forest Officer, for natives at Umgusa and Fuller, for storeroom and stable. A cottage at Fuller Siding was loaned to the Assistant Forest Officer by the courtesy of Messrs. Knight & Folkestad of the Zambesi Sawmills, Ltd.

At the Mtao Forest Reserve all outbuildings were kept in repair, the extension of the manager's quarters was commenced and a new cattle shed was erected.

At the European labour camp the forester's cottage was re-thatched and a verandah added. A mess hall for the labourers was completed; a motor shed was built, but has not yet been roofed; and the foundations were laid for six rooms for European labourers.

III. Financial Results.

Revenue.—The total revenue for the period under review was £2,248 14s. 10d.: that accruing from the Forest Nursery, Salisbury, was £1,985 2s. 11d., and from the Mtao Forest Reserve £263 11s. 11d.

Detailed statements of revenue are as follows:—

Statement of Revenue Received at the Forest Nursery, Salisbury, during the Calendar Year 1926.

Timber trees	£1,102	7	5
Hedge plants	177	9	7
Shrubs	470	19	4
Seeds	214	16	0
Timber	19	10	7
Total	£1,985	2	11

This amount includes free issues to the value of £431 1s. 10d.

The total exceeds all previous records, and shows an increase of £763 19s. 7d., as compared with the calendar year 1925.

Statement of Revenue Received at the Mtao Forest Reserve during the Calendar Year 1926.

Timber trees	£228	9	11
Hedge plants	15	12	6
Shrubs	3	18	9
Seeds	0	5	9
Timber	15	5	0
Total	£263	11	11

This amount includes free issues to the value of £89 3s. 1d., and shows an increase of £80 19s. 6d., as compared with the calendar year 1925.

IV. Administration.

The staff of the Forestry Branch consists of the following:—

J. S. Henkel, Forest Officer.
A. S. Thornewill, B.A., Assistant Forest Officer.
E. J. K. Edwards, B.A., Assistant Forest Officer.
Miss N. Toft, B.Sc., Technical Clerk.
J. W. Barnes, Manager, Forest Nursery, Salisbury.
W. P. de Klerk, Forester-in-charge, European Labour Scheme, and Acting Manager, Mtao Forest Reserve.
G. E. J. Badcock, Assistant to Manager, Forest Nursery, Salisbury.

V. General.

The past year has been a trying one for exotic tree growth on account of rapid and complete changes of weather. The commencement of the year was very wet, followed abruptly by hot and dry weather. The summer rains fell late and were interrupted by drought. Throughout the Colony such conditions left their mark on almost all species of young exotic trees; and it follows that in a Colony with such uncertain conditions only the hardiest species may be planted with safety for future timber supplies.

Exhibits were staged at Umtali, Bulawayo and Salisbury Agricultural Shows.

Farmers' associations were visited by the Forest Officer or his representative as follows: Plumtree, Gwelo, Glendale, Bindura, Ayrshire-Sipolilo, Que Que, Gatooma, Concession,

Umvukwes, South Marandellas, Macheke Valley, Bromley, Fort Victoria, Banket, Salisbury South and Beatrice. In all 117 farms were visited. The Mtao Forest Reserve was also frequently inspected. The foregoing duties entailed absences from headquarters on 110 days.

Publications during the year were:—"Wind Breaks and Shelter Belts," by A. S. Thornewill; "Raising Plants from Cuttings," by A. S. Thornewill; "Mtao Forest Reserve" (Editorial for *Agricultural Journal*), by A. S. Thornewill; and Price Lists for Forest Nursery, Salisbury, and Fairfield Nursery, Mtao.

The value of timber imported into Rhodesia continues to be very high. From the latest records available it has reached the total of £160,701 for 1925. The prices of imported timber are increasing.

The distribution of the Colony's expenditure under this head for 1923, 1924 and 1925 is shown in the following statement. In order to obviate the continuance of such expenditure in the future, several private afforestation schemes on a large scale are being embarked upon by private firms; but it is only by a considered policy of State afforestation that it will be possible to make the Colony self-supporting, and retain such sums of expenditure in the country.

Value of Articles Imported, all of which may be Produced and Manufactured in the Colony.

Article.	1923. £	1924. £	1925. £
Matches	10,862	10,545	10,976
Boxes	5,511	5,069	10,730
Casks	nil	nil	nil
Pick Handles, etc.	1,285	3,193	2,282
Houses and frames	19,437	14,582	14,511
Planed and grooved floor and ceiling timber	12,432	11,805	13,811
Planed and grooved other timber	2,258	847	2,803
Indian teak timber	1,206	2,275	1,738
Manufactured timber	37,947	43,027*	49,190*
Manufactured timber n.e.e.	9,989	56,296†	53,833†
Railway sleepers	28,714‡	628	827
Tramway sleepers	nil	(all wood)	(all wooden)
Total	£129,641	£148,267	£160,701

* Includes unmanufactured timber, such as cane and bamboos, rattans, oak, pitch pine, other pine, basketware, beaver boards and unmanufactured timber n.e.e.

† Includes manufactured articles, such as brushware, corks and bungs, billiardware, chairs and settees (wicker), other chairs, furniture, picture frames, other wooden furniture n.e.e., hubs, rims, spokes and felloes, etc., corkdust, sawdust, husks, wood meal and wood wool manufactures n.e.e.

‡ Percentage of metal sleepers not stated.

In regard to private afforestation, the Statistician gives further proof of the increasing interest that is being taken by the public.

For the season 1925-26 the number of acres of plantations of forest trees established was 1,391, representing an increase of 38 per cent. The total area is given as 5,015 acres.

During the year the Forest Service herbarium was increased by the addition of 118 specimens.

At Greenwood Park, Salisbury, the planting of indigenous species has been continued. Twenty-five species are represented by the plantings which have been done during the year. Specimens of fifteen further species are being raised at the Forest Nursery, Salisbury.

A. S. THORNEWILL,
For Forest Officer.

Annexure "K."

Report of the Stock Adviser for the Year 1926.

On the 1st August the writer commenced his duties as Stock Adviser, and during the five months spent 113 days on tour, visiting 147 farms, viz., 97 in Matabeleland and 50 in Mashonaland. Six farmers' meetings have been addressed and judging carried out at the Bulawayo, Gwelo and Salisbury Shows. On three occasions practical demonstrations were given with live stock. At various times several herds have been sorted out and classified.

The visiting of different farms provides an excellent opportunity of studying different breeds of cattle and their environment and for discussing with the stock owner the problems of cattle breeding and live stock in general.

Cattle.—During the period from 1st August, 1926, to 31st December, 1926, the writer has seen a good many herds of cattle, and as the cattle industry must be the mainstay of the agricultural prosperity of the Colony, it is to be regretted that so many animals are found to be of an inferior description, unprofitable as dairy stock and unfit for the beef export trade, except probably to the Congo. Good cattle are, however, being bred and reared successfully in small numbers in different parts of the Colony, thus proving that most districts are suitable for the breeding of higher grade stock. The problems confronting the cattle industry are the improvement of dairy stock to establish a sound dairy industry, and to improve the beef breeds in order to compete in the European markets. Most breeders are anxious to improve their herds and many have expressed their desire to purchase good bulls by direct importation from Great Britain. These breeders cannot spare the time and capital entailed in a trip overseas, and it therefore seems desirable to consider whether facilities could not be extended to these breeders to purchase their requirements through the Department or by delegating some one to act on its behalf.

During the year a number of dairy stock has been imported from the Union under the Government live stock loan scheme and otherwise. With the exception of a few Ayrshires and Shorthorns, these cattle are all high grade Frieslands and in most cases have been satisfactory. This scheme is a step in the right direction and should play an important part in the improvement of both beef and dairy stock.

Prices of slaughter and other stock show a marked improvement over the two or three previous years. This is partly due to the drought and consequent scarcity of prime slaughter stock in the Union, with the result that there was a keen demand on the Johannesburg market for Southern Rhodesian cattle at approximately 5s. per 100 lbs. higher than 1925 prices.

The total number of cattle exported during the year amounted to 74,646 head, an increase of 14,112 head over the exports for 1925.

The exports were made up as follows:—

Union of South Africa	12,250
For slaughter overseas	49,595
To England and Continent on hoof	310
Belgian Congo	11,845
Northern Rhodesia	32
Portuguese East Africa	614

During the year two shipments of live stock were exported—180 head to England and 130 head to the Continent. The net prices realised in England compared favourably with the top market prices ruling in Johannesburg at that time. No returns are available for the 130 head shipped to the Continent. A number of farmers in the grain growing districts are anxious to take up the feeding of steers, but find it difficult to procure animals suitable for that purpose.

Sheep.—Owing to the good local demand for mutton, farmers seem to be taking more interest in this branch of farming, and small flocks seem to do well in most districts if properly cared for. The breeds most in evidence are crosses with the Blackhead Persian rams and native ewes. Suffolk Down rams are being introduced for grading up purposes and should in time increase the size and weight and improve the quality of the mutton.

During the year, 500 Merino ewes and 15 Merino rams have been imported from the Union of South Africa for experimental purposes and have been distributed into five lots of 100 ewes and 3 rams each to the following farmers:—H. D. Wooler, Retreat, Plumtree; C. L. Carbutt, Harden Heights, Inyati; E. Futter, Lewis, Somabula; Dickenson Bros., Inyazura, Rusape; and D. J. Wiese, Cecilton, Melsetter. Owing to the short time these sheep have been in the Colony it is as yet too early to report on this experiment.

Pigs.—Where dairying is carried out pigs are doing well, and the quality and uniformity throughout the country are of a fairly high standard. Large Blacks are the most popular breed, with a few Berkshires and Middle Whites, which are used for crossing purposes with the Large Black sows.

W. FLEMING.
Stock Adviser.

Annexure "L."

Report of the Mycologist for the Year 1926.

I arrived in Salisbury to take up the appointment of Mycologist on 19th October, so that my report will only include work done from that date until 31st December. The remainder of the investigations carried out by Mr. Eyles during the year will be included in his report.

Movements.—I have visited in all 25 farms in the Concession, Marandellas, Gatooma, Norton, Sinoia, Arcturus and Bulawayo districts, from each of which material was collected and examined in the laboratory.

Laboratory.—Up to the 31st December 70 lots of material were received and examined, the majority of which were tobacco.

Wildfire and angular spot organisms have been isolated and are being grown in culture for confirmation of the presence of these two diseases.

Cercospora nicotianæ E. and E., *Phyllosticta nicotiana* E. and E. and *Macrosporium longipes* have been found in connection with leaf spots, whilst a species of *Macrosporium*, distinct from *M. longipes*, and a so far unidentified fungus are suspected of being the cause of diseases of tobacco seedlings in the seed beds. Numerous field observations have also been made upon various tobacco leaf spots, but no definite conclusions have so far been arrived at. In connection with these observations, a survey of the behaviour of and environmental conditions affecting wildfire has been commenced, since it is patent that a thorough knowledge is required of the climatological, soil and other local conditions governing the incidence and spread of this disease.

So far there has been no record this year of root diseases of tobacco other than root knot due to Nematodes, and a suspected case of black root rot caused by *Thielavia basicola* (B. & Br.) Zopf was found to be a case of attack by a species of *Rhizoctonia*, probably *R. bataticola*.

From the remainder of the material examined 25 organisms have been obtained in pure culture and await definite identification and confirmation from other sources.

Investigation into the parasitism of several fungi and bacteria is, however, proceeding, but the increasing amount of routine work leaves little time to be given to obscure diseases.

New records for Southern Rhodesia are as follows:—

Tranzschelia punctata (Pers.) Arth., on apricot leaves, Umtali.

Cladosporium herbarium (Pers.) Lk., on orange twigs, Mazoe.

Stem rot of paw-paw not yet identified, probably due to *Macrosporium* sp., Essexvale.

Sclerotium rolfsii Sacc., on delphinium, Maryland.

Fusarium udum (Butl.), on pennistemon, Maryland.

Bacterial die-back of apple trees, probably fireblight, due to *Bacillus amylovorus* (Burr.), De Toni, Fort Victoria.

Glomerella psidii (Del.) Shel. (— *réfomaculans*?), on plum fruits.

J. C. F. HOPKINS,
Mycologist.

Annexure "M."

Report of the Botanist for the Year 1926.

Plant Diseases.—During the period January to October (when Mr. J. C. F. Hopkins took over the duties of Mycologist), 128 pathogenic specimens were examined and reported on, the number of different hosts affected by disease being 41 and the number of diseases 72. Tobacco and citrus were the crops on which most work was done.

"Granville Wilt" was found on tobacco as an isolated case, this being its first record for the country. As no further case appeared it may be hoped this disease will not prove serious in Rhodesia. Angular spot and wildfire of tobacco leaf were again identified, wildfire being apparently less common than the first.

Two fruit diseases of citrus gave much trouble in the largest groves; one is a raised canker-like pustule on the skin, and the other a scurfy discoloration of the surface. Neither of them affects the eating quality of the fruit, but both are disfiguring and lower market values. Extended experiments were carried out in the laboratory, but all attempts to isolate organisms failed, and it is believed that both types of lesion are due to some physical or mechanical injury to the fruit. Further investigations may lead to modification of this opinion.

In addition to the study of crop diseases, including fruit trees and garden plants, a number of diseases found on indigenous trees and herbs were collected in order to discover to what extent the wild plants are acting as hosts for diseases attacking economic crops.

Botany.—During the year, 331 plants were identified for various officers of the Agricultural and other Departments, many of them being of economic importance, including the hosts of certain insect crop pests, reputed stock poisons, weeds, fodders, etc. Little advance can be made in our knowledge of native poisons and drugs until means are found to have such material submitted to a pharmacologist.

From the Medical Pathological Laboratory a plant was submitted which possesses certain characteristics suggesting the presence of a drug related to quinine.

A quantity of material, including roots, was collected for the Medical Research Officer and has, we understand, been sent to London for analysis and report. A good supply of seed of the same plant was sent to the manager of the Salisbury Experiment Station for planting.

The commonly grown local mulberry was identified as *Morus alba*, which is the species favoured by sericulturists.

Preparatory to beginning a botanical survey of the Colony, the records of the official herbarium belonging to the Department were examined and found to contain nominally 1,940 sheets of specimens. As soon as the classification of these has been completed, it is hoped to make large additional collections so that a really representative set of properly named native plants may be built up as a departmental herbarium for future reference.

F. EYLES,
Botanist.

Annexure "N."

Report of the Editor, "Rhodesia Agricultural Journal," for the Year 1926.

The demand for the Journal continues to increase, and it is now necessary to print 2,200 copies monthly, as compared with 1,900 copies twelve months ago. The monthly issue, although it entails considerable demands upon the staff to supply the necessary material, is undoubtedly justified and in keeping with the expansion of the agricultural industry of the Colony. The range of subjects dealt with during the year has been very wide, and practically every phase of agricultural activity in the Colony has, at some time or other, been written up. The object has always been and is still to present such matter in a readily understandable form, avoiding technicalities as far as possible. Large numbers of bulletins have been reprinted from articles which have appeared in the Journal, and there is a constant demand for these, especially by new settlers. At the present time there are 288 different bulletins available for free distribution to residents of this Colony, and very valuable information is disseminated in this way.

The cost of printing the twelve issues of the Journal during the year was £1,975 11s. 3d., which includes the cost of bulletins. The total receipts from advertisements, subscriptions and incidental sales amount to £1,043 14s. 11d., made up of £558 15s. 3d. from advertisements, £438 19s. from subscriptions and £46 0s. 8d. from incidental sales.

W. E. MEADE,
Editor.

SOUTHERN RHODESIA.

REPORT

OF THE

Land and Agricultural Bank of Southern Rhodesia

For the Year 1926.

Salisbury, Rhodesia:
Printed by the Government Printer.

1927.

SOUTHERN RHODESIA.

Report of the Land and Agricultural Bank of Southern Rhodesia for the period 1st January to 31st December, 1926.

THE BOARD.

The personnel of the Board has not changed. On 1st July, 1926, Mr. H. G. M. Huntley automatically retired in terms of section 3 of the Land Bank Act, and, being eligible, was re-nominated by His Excellency the Governor (Government Notice No. 554 of 24th September, 1926).

Leave of Absence.—Mr. A. W. Redfern, Chairman of the Board, was granted eighty days' leave of absence as from 3rd February, 1926. Mr. H. G. M. Huntley was granted leave of absence for the period 11th March to 6th April, 1926.

Acting Chairman.—In the absence of the Chairman the Board nominated Mr. E. C. Pulbrook to act as Chairman as from 3rd February, 1926, in terms of section 4 (4) of the Land Bank Act.

Acting Manager.—Mr. S. Thornton was appointed by His Excellency the Governor to act as manager as from 3rd February, 1926, during the absence on leave of Mr. A. W. Redfern, in terms of section 4 (2) of the Land Bank Act (Government Notice No. 114 of 19th February, 1926).

MEETINGS.

During the year thirteen meetings of the Board have been held—ten in Salisbury and three in Bulawayo. Under the system of circulating applications referred to in the last annual report, the time given to the business of the Bank by members of the Board is naturally not wholly represented by the number of formal meetings called.

FINANCIAL.

The funds placed by the Government at the disposal of the Bank were increased from £500,000 to £750,000.

It will be seen from the statement of accounts that the operations of the Bank during the year under review resulted in a profit of £1,767 11s. 9d. After deducting the adverse balance of the previous year's profit and loss account there remains a net profit of £548 2s. 11d., which has been taken to reserve account in terms of section 51 of the Land Bank Act.

STAFF.

It was found necessary to appoint a junior shorthand typist on 1st August, 1926. A list of officers at present employed by the Bank was laid upon the table of the House of Assembly at the opening of the fifth session on 1st November, 1926, in terms of section 5 of the Land Bank Act.

POLICY OF THE BOARD.

Advances on First Mortgage.—As stated in the last report, the main object the Board has in view is to provide the reasonable financial requirements of applicants desirous of carrying out farm development work, to meet bonds called up and to relieve farmers of bonds bearing excessive rates of interest or onerous terms of repayment.

It is also the aim of the Board to take over gradually all sufficiently secured bonds of farmers desirous of obtaining the easy terms of repayment, even though the rate of interest on such existing bond may not be onerous.

The statistical return accompanying this report will show that mortgage bonds for a total sum of £67,965 have been taken over during the year, of which £41,000 carried interest of 8 per cent. or over.

It may be said that a saving of £2 per centum per annum, i.e., the difference between an 8 per cent. bond and the 6 per cent. charged by the Land Bank, is not of any great benefit to the individual farmer. If, however, it is considered that the annual payment of £8 13s. per cent. will in a period of 20 years liquidate the bond entirely, the great benefit to the farmer is made clear.

As an example of this benefit, a farmer with an ordinary 8 per cent. mortgage of £1,000 over his farm would in the course of 20 years pay £1,600 and still owe the capital sum of £1,000. Under a £1,000 bond to the Land Bank the farmer in the course of 20 years will pay £1,730, and both interest and capital will have been paid in full, i.e., by paying an additional £130 the capital debt of £1,000 will have been liquidated.

Further, as each instalment paid effects a reduction in the capital sum advanced, the farmer establishes in the course of time a credit on which to fall back in case of need.

Another advantage is the right which the applicant has to the cancellation of the bond against payment of the amount due under it at any time without notice.

CO-OPERATIVE AGRICULTURAL COMPANIES.

The following advances were approved during the year under review:—

Fixed Instalment Loans.—In terms of the Land Bank Act, section 34, sub-section (3) (a):—

Rhodesia Tobacco Warehouse and Export Company, Limited: £20,000 on first mortgage, in part further secured by a guarantee from the Government.

Co-operative Ginnery Companies: The Land Bank is, by virtue of a cession of debt, now also acting as agent for the Government in the matter of advances to the Co-operative Ginneries made by the Government, the Empire Cotton Growing Corporation and the British Cotton Growers' Association. Repayment of these advances is secured by first mortgage covering bonds each for £20,000 and collateral bonds passed in favour of the Land Bank by the respective ginneries concerned.

Cash Credit Loans.—Section 34, sub-section (3) (b):—

Rhodesia Tobacco Warehouse and Export Co., Ltd.	£50,000
Hartley District Ginnery, Ltd.	6,000
Bindura and District Co-operative Ginnery, Ltd.	2,000
Lomagundi Co-operative Ginneries, Ltd.	1,500

Loans of this nature are for one season only and are made to the co-operative company to enable advances to be made to members against tobacco or seed cotton deposited with and pledged to the company. The advances so made to the company are secured by a cession of any unpaid capital of that company, in addition to cessions of the individual pledges of members.

Repayment to the Bank is made as sales are effected. All advances made during the year 1925 have been repaid in full with interest.

OVERDUE INTEREST AND INSTALMENTS.

In only one case was interest overdue for more than twelve months at 31st December, 1926. In this particular case judgment has been obtained, and the property mortgaged will at an early date be offered for sale in accordance with the provisions of the Act.

The mortgage bond debtors (excluding co-operative companies) now number 506, and at 31st December only 39 of these were in arrear with interest for a total amount of £844 8s. At the time of writing the promise of a good harvest justifies the opinion that the greater portion of these arrears should be met as the debtors receive payment for their crops of the past season.

Payment of instalments in reduction of capital over and above the provisions for interest has, with comparatively few exceptions, been well maintained.

Although, as indicated above, the manner in which obligations generally are being met is highly commendable, there is still a tendency amongst a certain few debtors to consider that because the Bank was instituted by the Government for the benefit of the farming community liabilities to the Bank may be regarded lightly and of secondary importance in comparison with debts to ordinary creditors. The Land Bank Act, a great portion of which is devoted to setting forth remedies against defaulters, does not give cause for such opinion, and the Board has taken the measures necessary to correct any possible misunderstanding in this respect.

A definite intimation that summons is about to issue has in most cases of the kind under reference met with payment in response, but in four cases it has been necessary to proceed to a judgment of the High Court. The Board, in invoking the aid of the Court in these matters, has adopted such course, rather than that provided by the Act without recourse to the Courts, with a view to publicity. Publicity will have a cautionary influence on other debtors who may labour under delusion as to the Bank's attitude in similar circumstances.

In the four cases under reference there was no satisfactory evidence of any attempt to meet obligations. On the other hand, when there is evidence of real endeavour to meet obligations, no genuine farmer who, through circumstances beyond his control, has not reaped a crop need fear extreme measures unless the case is regarded as hopeless.

GENERAL.

The number of applications received during the year 1926 was 324 for advances aggregating £342,986, as compared with 365 applications for £420,727 in 1925, a decrease of 41 in number and £77,741 in amount. The average amount applied for in 1925 was £1,153, in 1926 £1,059.

Apart from the hint contained in the item "Withdrawn before Consideration," the statistical returns do not refer to the number of tentative applications which should never have been made to the Land Bank. It may not be out of place to quote a remark made by the Minister of Agriculture during the passage of the Bill through the House of Assembly. He said: "The Bank must be run like other banks—as a business institution. If it is wanted to subsidise any section of the farming community who are in deep waters, that must be done by some other Bill, not by this business organisation, which exists for business purposes and must be carried on according to business principles." It is the endeavour of the Board to administer the Land Bank Act with the greatest sympathy and elasticity, but the Board has no authority to go beyond the limits of that governing Act. The applicant who expects, for instance, to be advanced the full purchase price of a farm, and, often enough, a little more for expenses, is usually doomed to disappointment. Such an application is not reasonable. As a steadying influence in the appraisement of land a study of what it has produced in the past is recommended; where such details are not available a tight rein on the imagination is desirable.

An outstanding feature of farming during the past two seasons has been the failure of cotton to realise all that was expected of it. The disappointment of the harvest (due either to the failure of the crop or the drop in prices current)

has been commensurate with the enthusiasm which attended the planting. With many farmers, however, it was a first venture, and cotton is no exception to the rule that experience has generally to be bought. Despite the disappointments of the past, it would still appear to be the considered opinion of the Agricultural Department's experts that there is a future for cotton in Southern Rhodesia. The market is, of course, beyond the farmers' control, but here there should be no cause for pessimism. After all is said, to cotton belongs the credit of bringing many hundreds of acres under the plough for the first time last season, and its value even as green manure must not be overlooked.

To a much lesser degree disappointments with tobacco may be anticipated. In addition to suitable soil and barns, the culture of tobacco demands technical knowledge, experience, dogged application and some capital. The lack of any one of these factors will be reflected in results. The Board has dealt with a large number of applications for advances for the purpose of building curing barns, packing sheds, etc., and it is gratifying to report that in practically every instance evidence has been forthcoming that the applicant, realising that specialised knowledge and experience were necessary, had taken steps accordingly.

One of the tobacco grower's problems is the grading of his leaf. The cultivation of tobacco has now far outstripped the capacity of the large central warehouses to deal promptly with the grading of leaf. The individual grower has perforce to meet a situation the solution of which calls for both capital and technical knowledge. It would appear that he must either put up sheds and grade his own tobacco or co-operate with his neighbours and form a small co-operative society or company to supply building, equipment and staff to deal with his immediate district.

To say which is the more desirable course is not within the province of this report, but such an object, whether contemplated by an individual or a group, is one which would be regarded by the Board as having claim to such financial support as could be offered under the Land Bank Act.

Maize provided a satisfactory return to the farmer last season, and the promise for 1927 is favourable. The only observation which need be offered here is to emphasise the necessity for returning to the land a portion of what is taken from it. A judicious rotation of crops, fertilising and rest for the lands are factors in the "good husbandry" which forms a condition of an advance from the Land Bank and is the subject of a covenant in the bond.

The relationship between the Land Bank and its clients aimed at by the Board is one of closer intimacy than that which exists between the public and the commercial banks. This closer relationship, it is held, should be a distinguishing characteristic of the Land Bank. In furtherance of this principle the manager has during the past year visited various centres and a large number of individual farms, and it is hoped that it will be possible to extend this process systematically until practically every applicant feels that he has in the manager a representative on the Board who has that personal knowledge of conditions which is essential to a sympathetic consideration of any point which may arise.

S. THORNTON (Acting Manager).

E. C. PULBROOK (Acting Chairman),
HARRY S. HOPKINS,
H. G. M. HUNTLEY,
JOHN RICHARDSON,
Members of the Board.

THE LAND AND AGRICULTURAL BANK OF SOUTHERN RHODESIA.

Balance Sheet as at 31st December, 1926.

LIABILITIES.	£ s. d.	£ s. d.
Capital as voted, £750,000.		
Cash received on account		656,500 0 0
Treasury—Interest due		8,110 0 4
Sundry Creditors—		
Accounts payable	214 13 0	
Other	227 4 2	
		441 17 2
Advances to Ginneries—per contra		39,484 13 2
Fees Suspense Account		402 10 0
Profit and Loss Account—		
Balance from Revenue and Expenditure Account—excess of revenue over expenditure ...	1,767 11 9	
Less Balance at 31st December, 1925	1,219 8 10	
		548 2 11
		£705,487 3 7

ASSETS.	£ s. d.	£ s. d.
Sundry Debtors for Loans—		
Mortgages (sec. 16a)	556,795 19 0	
Notes of Hand (sec. 16d) ...	32,124 5 5	
Co-operative Societies (sec. 34 (3) b)	51,058 1 10	
Interest—		
At 31.12.25 ... £140 19 5		
At 31.12.26 ... 14,921 10 0		
	15,062 9 5	
		655,040 15 8
Sundry Debtors—Charges recoverable		190 3 6
Sundry Debtors—Secured		297 8 6
Sundry Debtors—Unsecured ...		249 16 2
Advances to Ginneries—ceded by Government for collection—per contra		39,484 13 2
Movable Assets at 31.12.25 ...	335 18 10	
Depreciation	63 3 11	
	272 14 11	
Purchases during year at cost	378 16 3	
		651 11 2
Cash at Bank		9,571 13 1
Cash on hand		1 2 4
		£705,487 3 7

Revenue and Expenditure Account, 1st January to 31st December, 1926.

EXPENDITURE.	£ s. d.
To Interest on Capital Advances	27,135 19 2
,, Salaries and Wages	2,517 14 11
,, Board Fees	580 4 4
,, Board Subsistence and Travelling	274 12 8
,, Printing, Stationery and Advertising	155 16 3
,, Rent	126 0 0
,, Depreciation	63 3 11
,, Pension Fund	102 5 5
,, Periodicals	13 1 0
,, General Expenses	104 16 3
,, Balance carried to Balance Sheet	1,767 11 9
	£32,841 5 8

REVENUE.	£ s. d.	£ s. d.
By Interest earned—		
Received	17,465 19 6	
Accrued, outstanding	2,215 10 3	
Accrued, not due	12,705 19 9	
		32,387 9 6
,, Application Fees		248 3 0
,, Net Fees for Bonds prepared		117 11 0
,, Guarantees		34 1 0
,, Forms		37 13 0
,, Bonds released		14 14 0
,, Miscellaneous		1 14 2
		£32,841 5 8

ERNEST C. PULBROOK, Acting Chairman,
HARRY S. HOPKINS,
Members of the Board.

S. THORNTON, Acting Manager.
A. J. DUNCAN, Acting Accountant.

AUDITOR GENERAL'S CERTIFICATE.

The above Balance Sheet and Statement of Revenue and Expenditure have been examined with the books, registers and vouchers of the Land Bank and have been found in order, all audit requirements having been met. The bonds and securities have been examined and found in order; the loans granted, excluding those ginnery loans in respect of which the Land Bank is acting as agents of the Treasury, have been made in terms of the governing Act. The bank balance and cash in hand have been agreed. In my opinion this balance sheet correctly represents the financial position of the Land Bank as shown by the books as at the 31st December, 1926.

31st January, 1927.

R. H. EVERETT, Auditor General.

Table 1.

APPLICATIONS RECEIVED.

Date. 1926.	No. of Applications received.	Amount. £
January	14	14,027
February	16	16,900
March	23	23,466
April	20	21,810
May	30	40,560
June	34	40,275
July	39	44,050
August	48	45,500
September	37	34,445
October	22	20,870
November	17	17,578
December	24	23,505
	324	342,986

Table 2.

APPLICATIONS RECEIVED.

Size of Loans.

For loans of—		
£1— £500	... ...	124
£501—£1,000	... ...	78
£1,001—£1,500	... ...	48
£1,501—£2,000	... ...	34
£2,001—£2,500	... ...	19
£2,501—£3,000	... ...	21
Total	...	324

Table 3.

ANALYSIS OF APPLICATIONS RECEIVED

From 1st January to 31st December, 1926.

Nos. 652 to 975.

No.	£		No.	£
10	22,916	Brought forward (awaiting valuation at 31st December, 1925).		
324	342,986	Applications received—		
		Considered by Board	277	300,361
		Withdrawn before Consideration ...	26	23,827
		Awaiting Valuation, etc.	31	41,714
334	365,902		334	365,902
49	68,475	Brought forward (awaiting registration at 31st December, 1925).		
277	300,361	Considered by Board—		
		Granted and Completed:		
		On First Mortgage (180 Bonds) ...	171	202,738
		On Promissory Notes	58	16,180
		Total Paid	229	218,918
		Granted, awaiting Completion ...	35	72,778
		Granted, declined by Applicant ...	28	37,900
		Total Granted	292	329,596
		Rejected	34	39,240
326	368,836		326	368,836

Table 4.

PERIODS FOR REPAYMENT OF LOANS ISSUED.

£	5 Years		10 Years		15 Years		20 Years		25 Years		Total	
	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£
100	...	...	1	100	...	...	...	...	...	...	1	100
150	...	...	1	150	...	...	...	...	...	...	1	150
200	4	800	2	400	1	200	1	200	...	...	8	1,600
250	2	500	2	500	1	250	...	...	..	...	5	1,250
275	...	...	...	...	1	275	...	...	...	...	1	275
300	...	...	...	...	2	600	2	600	...	...	4	1,200
350	1	350	1	350	2	700	1	350	...	..	5	1,750
400	...	...	4	1,600	1	400	...	...	...	...	5	2,000
450	...	...	...	...	1	450	1	450	...	...	2	900
500	...	...	7	3,500	4	2,000	6	3,000	...	...	17	8,500
550	...	...	...	...	...	...	1	550	...	...	1	550
600	...	...	2	1,200	2	1,200	4	2,400	...	...	8	4,800
650	...	...	...	...	1	650	...	...	...	...	1	650
700	...	...	...	...	1	700	2	1,400	...	...	3	2,100
750	...	...	1	750	4	3,000	1	750	.	...	6	4,500
775	...	...	...	...	...	...	1	775	...	...	1	775
800	...	...	...	...	...	...	8	6,400	...	...	8	6,400
850	...	...	...	...	...	...	1	850	...	....	1	850
860	...	...	...	...	...	...	...	...	1	860	1	860
900	...	..	...	...	2	1,800	3	2,700	...	..	5	4,500
950	...	...	...	...	...	...	1	950	...	..	1	950
1,000	1	1,000	2	2,000	3	3,000	9	9,000	2	2,000	17	17,000
1,100	...	...	...	...	...	...	2	2,200	...	...	2	2,200
1,150	...	...	...	...	...	...	1	1,150	...	...	1	1,150
1,200	...	...	...	...	1	1,200	6	7,200	1	1,200	8	9,600
1,250	...	...	...	...	1	1,250	4	5,000	...	...	5	6,250
1,300	...	...	...	...	...	...	1	1,300	..	...	1	1,300
1,400	...	...	1	1,400	...	...	1	1,400	...	...	2	2,800
1,500	...	...	1	1,500	...	...	10	15,000	...	...	11	16,500
1,600	...	...	...	...	...	...	1	1,600	...	...	1	1,600
1,700	...	...	...	...	1	1,700	1	1,700	...	..	2	3,400
1,750	...	...	..	...	...	...	1	1,750	...	...	1	1,750
1,800	...	...	...	...	...	...	6	10,800	...	...	6	10,800
2,000	...	...	1	2,000	...	...	10	20,000	..	...	11	22,000
2,200	...	...	...	...	2	4,400	...	...	...	..	2	4,400
2,250	...	...	...	...	1	2,250	3	6,750	1	2,250	5	11,250
2,300	..	...	...	...	...	...	2	4,600	...	...	2	4,600
2,500	1	2,500	1	2,500	1	2,500	3	7,500	...	...	6	15,000
3,000	...	...	1	3,000	3	9,000	4	12,000	...	...	8	24,000
	9	5,150	28	20,950	36	37,525	98	130,325	5	6,310	176	200,260

Miscellaneous Bonds	4	2,478
Total ...	180	202,738

Table 5.

ANALYSIS OF APPLICATIONS,

Showing allocation of Loans as per details furnished by Applicants.

Bonds Nos. 367—546,

Issued during 12 months ended 31st December, 1926.

For discharge of existing Bonds bearing Interest as under:—	£
10 per cent. Bonds	2,100
9 per cent. Bonds	4,150
8½ per cent. Bonds	3,775
8 per cent. Bonds	30,975
7 per cent. Bonds	18,042
6½ per cent. Bonds	200
6 per cent. Bonds	7,568
5 per cent. Bonds	1,155
Farming Operations	10,013
Buildings	11,375
Dip Tanks	115
Fencing	1,790
Cattle, Sheep, etc.	2,165
Purchase of Land:—	
Applicants owning no Land	71,605
Applicants owning insufficient Land	14,030
Implements	2,180
Improvements and Development	5,964
Liabilities	13,141
Irrigation	2,395
	£202,738